...GICAL ROOM
...RAL LIBRARY
...Y. OF MICH.

DEC 1 0 1930

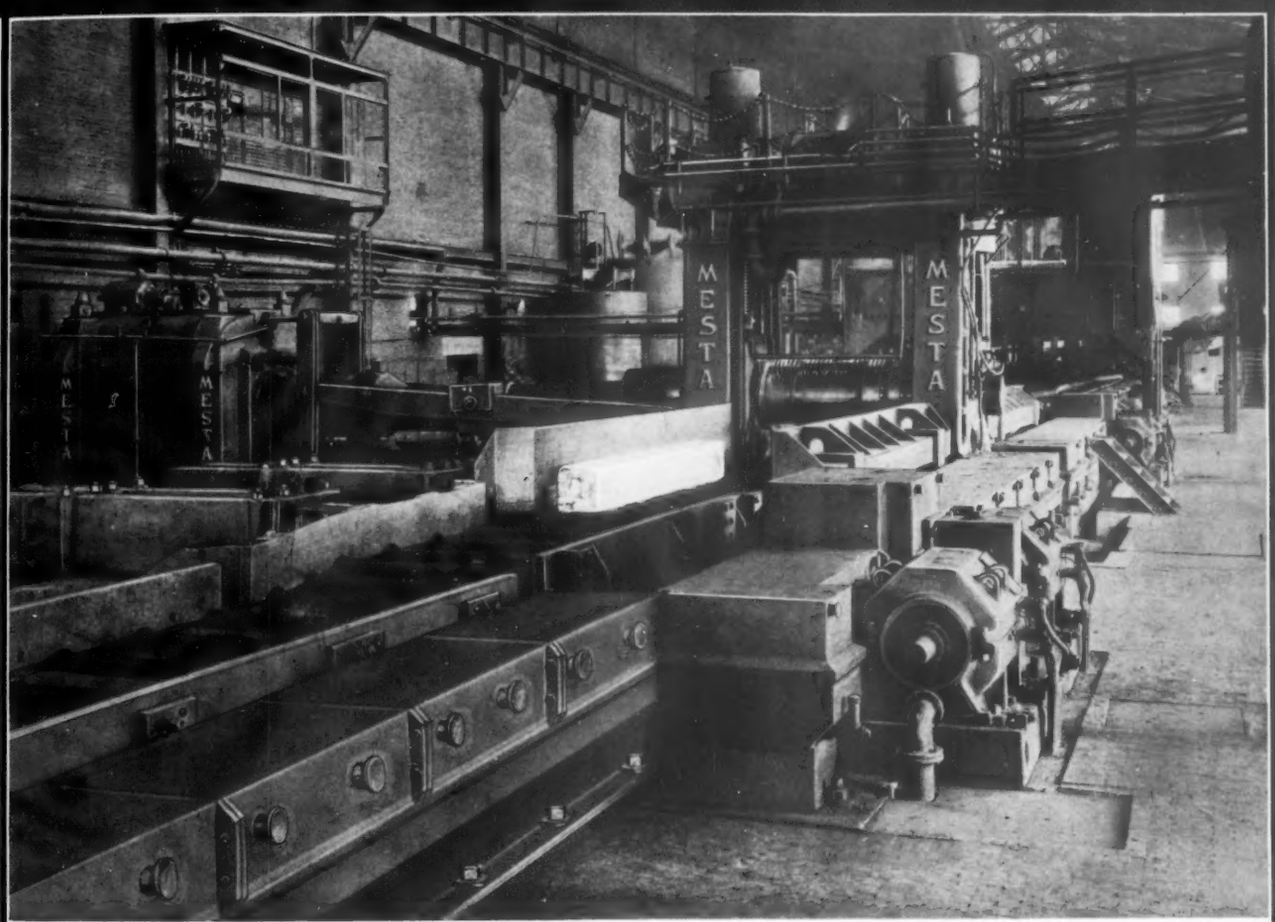
STEEL

For forty-eight years—IRON TRADE REVIEW

December 18, 1930

MESTA

MODERN BLOOMING MILLS



MESTA 40" Blooming Mill
with MESTA patented Manipulator and Tables

Mill equipped with MESTA patented Spindles and Spindle Shifters. Roll changing is an extremely easy and quick operation. Installation complete with MESTA patented Manipulator, Tables and Feed Rollers equipped with Roller Bearings throughout.

MESTA MACHINE COMPANY · PITTSBURGH

BECKER OVENS

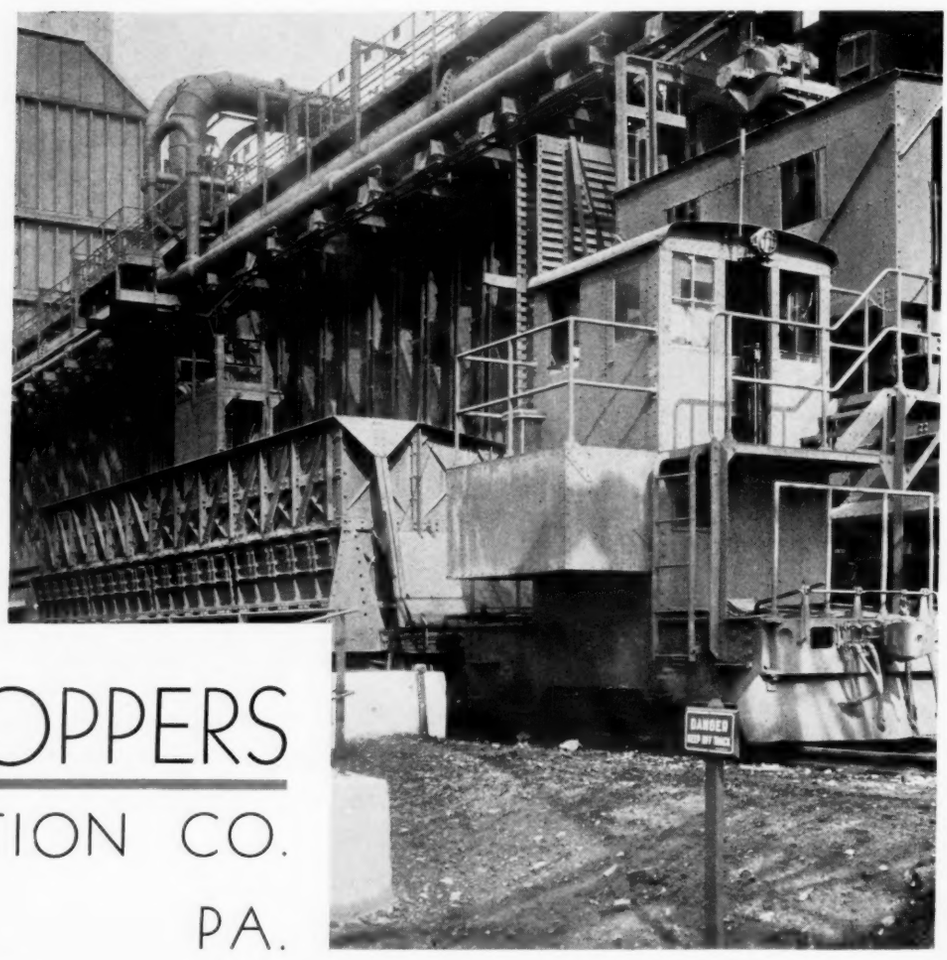
NEWS FOR PRODUCERS
OF BY-PRODUCT COKE AND GAS

The Bureau of Mines states that the consumption of fuel for heating buildings is the largest single item in the national demand for energy—exceeding even railroad consumption. Over 125 million tons of bituminous coal and anthracite are used for this purpose.

The opportunity is clearly present for clean, well prepared coke to increase its present important position in this market.

Koppers plants combine the production of good coke with the production of gas at maximum efficiency.

Write for Becker Oven catalog.



THE KOPPERS
CONSTRUCTION CO.
PITTSBURGH PA.

Vol. 87, No. 25, Dec. 18, 1930, issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under the act of March 3, 1879. Subscription $6 a year in U. S. and Canada; foreign £2:0:0; single copies, 25c.

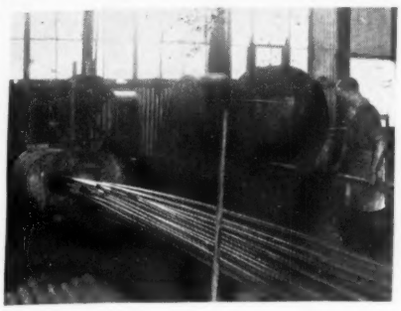
EDITORIAL STAFF
E. L. SHANER
Editor
ASSOCIATE EDITORS
E. C. BARRINGER, A. J. HAIN, G. H. MANLOVE, E. F. ROSS, J. D. KNOX, W. H. LLOYD, GUY HUBBARD
New York
E. C. KREUTZBERG, B. K. PRICE, H. R. SIMONDS
Pittsburgh W. G. GUDE
Chicago F. B. PLETCHER
Washington L. M. LAMM
London VINCENT DELPORT

STEEL

Published Every Thursday by
PENTON PUBLISHING CO.
PENTON BUILDING, 1213 WEST THIRD ST., CLEVELAND, O.
C. J. STARK, *President* J. D. PEASE, *Vice President*
F. V. COLE, *Secretary*

ADVERTISING STAFF
G. O. HAYS
Business Manager
New York
J. F. AHRENS, E. W. KREUTZBERG
Pittsburgh
S. H. JASPER, C. B. HUMPHREY
Chicago
L. C. PELOTT, C. A. WARDLEY
Cleveland
JOHN HENRY, R. C. JAENKE
F. F LIGHT, *Circulation Manager*

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE



Manufactures Seamless Steel Tubes for Over Forty Years. Page 43.

THIS WEEK:

IN THIS era of mechanized production finger nails and teeth still are being used to test the finish quality of precision ground work. An instrument employing radio tubes is proposed as an improvement on these "cave man" methods. This brings up the related question: "Is there a yardstick of machinability?" Unquestionably there is, but the keener the search for it the more elusive it appears to be. Read about the efforts being made to evict the rule of thumb methods from machine shops, page 56.

STEEL is published by the Penton Publishing Co., Cleveland, O. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association

Branch Offices:

New York	220 Broadway
Chicago	Peoples Gas building
Pittsburgh	Oliver building
San Francisco	Alto building
Washington	National Press building
Cincinnati	Schmidt building
London	Caxton House, Westminster, S.W.1
Paris	9 Rue de Londres
Berlin	Dahlmerstrasse 64 A, Lichterfeld-West

Subscription in the United States, Canada, Cuba and Mexico $6 per year; in Great Britain and European countries £2:0:0.

Entered as second class matter at Post Office at Cleveland under the Act of March 3, 1879.

Copyright 1930 by the Penton Publishing Co.

CONTENTS

December 18, 1930

THIS WEEK IN STEEL 21

Lamont Says 1930 Compares with All but 1929 23
The Business Week in Washington 23
World Trade Is Lower by 8 Per Cent 24
"Key" Relief Bills Delayed in Congress 25
Steel Founders Strive to Improve Merchandising Methods 26

Industrial Men in the Day's News 28
Obituary 30
Here and There in Industry 31
News of the Pittsburgh Steel District 32

EDITORIAL—Prosperity Will Return 34
Slow Gradual Recovery Is Outlook for 1931 35
A Single Breaker May Recede, but the Tide Is Coming In ... 36
THE BUSINESS TREND—Experts Conservative in 1931 Forecasts 38

Forty Years of Seamless Steel Tubes—By H. R. Simonds .. 43
Good Selectivity Is Required for Magnetic Analysis—By Dr. Sigfrid Specht 48
Machines Speed Production of Eccentric Bearings 53
Perfects Machine for Electric Welding High-Carbon Structural Steel Tubes 54
Seek Yardsticks to Measure Finish and Machinability 56
Engineers See Lubrication and Accident Prevention as Requiring Attention 59
Machine-Cast Pig Iron Has Greater Uniformity—By F. B. Riggan and L. S. Morgan 60
Scanning the Technology of Steel 64
Machine Tools and Plant Equipment 66

MARKET SUMMARY 73
MARKET REPORTS AND PRICES 74-104
CONSTRUCTION AND ENTERPRISE 107
NEW TRADE PUBLICATIONS 112
WHERE-TO-BUY DEPARTMENT 113
ADVERTISERS' INDEX 144

You Never Can Tell Where Lightning Will Strike

Joseph T. Ryerson, who founded this business in 1842 adhered strictly to a policy of concentrating his purchases with those who not only had the desire but also the ability to take care of him in an emergency. To this fact alone he attributed the life of this organization on at least two occasions* many years ago.

There is little doubt but that an under market price may be secured occasionally by shopping around. A few dollars may be saved . . . a chance taken on quality and delivery. But that is only half the picture.

No one knows when a general condition or some business influence; some invention or new situation in the industry may bring embarrassment. We all expect good business and continued success. But at best, even when the horizon is clear, it pays to buy from a strong dependable House that can cooperate with you when necessary.

*The Chicago Fire. Panic of 1857.

A few of the 1,001 products always in stock, offering the opportunity to combine orders, deliveries, checking, and clerical work. Immediate shipment is assured.

Bars	Sheets, Full Finished	Strip Steel	Forging Bars	Concrete Reinforcing
Structurals	Refined Iron	Rivets and Bolts	Babbitt Metal	Firmtread Plates
Rails	Screw Stock	Boiler Tubes and Fittings	Tool Steel	Small Tools
Plates	Turned, Ground and Polished Shafting	Welding Rod	Alloy Steel	Machinery, etc.
Sheets, Blk. & Galv.			Allegheny Metal	

JOSEPH T. RYERSON & SON INC.

Plants: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

Representation in: Minneapolis, Rockford, Kansas City, Tulsa, Houston, Newark, New York, Denver, Los Angeles, San Francisco

RYERSON

STEEL-SERVICE

Volume 87 Number 25

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

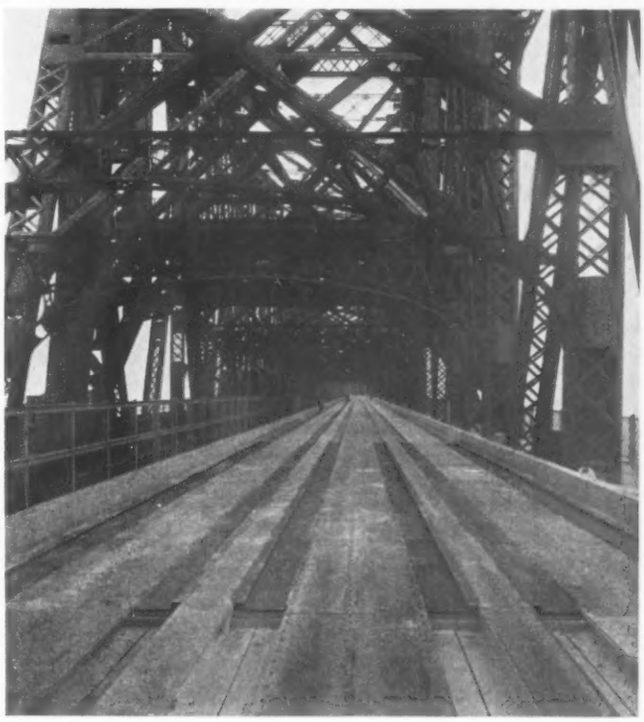
PEACE rages at Washington. Leaders in congress would submerge their antipathy toward the President because he scented "politics at the expense of human misery" in the flood of unemployment relief bills, appropriating four and one-half billion dollars, and would push certain "key" measures. But ruffled tempers are making for delay, with full knowledge that each passing day heightens the legislative jam on supply bills and threatens a special session. . . . The senate is balking on unlimited power for the President in distributing $116,000,000 as a special fund for accelerating public construction (Page 25) and the measure is not yet ready for the President's signature. The house is thwarting administration leaders who would halve the $60,000,000 voted by the senate to the secretary of agriculture to be loaned for the purchase of seeds, fertilizer, feed for livestock—and food for humans. Secretary Hyde, who would administer the fund, warns that the loaning of government funds for the purchase of food dangerously approaches the dole system, which few would transplant from England. . . . The General Electric Co., proceeding with its far-sighted program of stabilizing employment, is extending its work guarantee to employes of its incandescent lamp works. Employes of two years or longer service contribute 1 per cent of their wages to a fund, the company matching this sum. In return the company will provide 30 hours' work weekly for 50 weeks each year or make up the difference (Page 26).

Now for the Procession of Forecasts!

Leading the procession of year-end business summaries and forecasts is the annual report of Secretary of Commerce Lamont who appraises the year ending last June 30 as only 6 per cent below the business level of 1928-29, and rates the year as 110 on the basis of 1923-25 equaling 100 (Page 23). . . . Reviewing world trade in 1930, the National Foreign Trade council finds the total of twenty-two and one-half billions exactly 8 per cent short of 1929. For the United States the decline was 25 per cent, but even this was 35 per cent above prewar averages (Page 24). . . . The normal business trend is upward, 1930's grief cannot compare with 1893; the optimist is bound in the long run to be right, says Charles M. Schwab (Page 23) . . . The public has retrenched too much; a fear complex holds back industry," declares the National Manufacturers' association (Page 25).

Will Buyer Be a Santa to Steel?

The "fear complex" in spending appears to be less in evidence in the department stores and theatres these days than it does among steel



"Grasshopper" drivers will be kept in line on the Queensboro bridge, New York, when groove runways 10 inches deep, of fabricated plates lined with wood block and concrete, are put in service. Edward A. Byrne, a city engineer, designed the runways; American Bridge Co. and McClintic-Marshall Co. fabricated the steel; Bersin-Romm Engineering Corp. laid the runways.

consumers. Tonnage continues lacking and some producers are beginning to express vague fears that the new prices after all may not hold. But stabilization will prevent further declines. In the East the situation is relatively better than in the Middle West (Page 73). . . . Steelworks operations trend downward, a seasonal development, while makers urge users to specify requirements before Christmas that material may be rolled and employes' stockings may be filled (Page 80). . . . With Youngstown Sheet & Tube Co. blowing out two blast furnace stacks, only six of 34 units in the Mahoning valley district are active (Page 88).

Economists Revise September Views

Wise economists who were sunny in September are cloudy and cold now in December; few would say they were temperamental, yet some of them appear to be just as unduly pessimistic today as they were buoyant in the early fall (Page 38). . . . Col. Leonard P. Ayres, of Cleveland, is impressed by the length and severity of the depression and views 1931 as a year of slow business recovery, "with activity not getting back to normal by the end of the year" (Page 35). . . . Secretary of Commerce Lamont comments on the remarkable freedom of this country from strikes during trying times; in the unfortunate days of 1921 labor discords were more than five times as numerous as in 1931, and involved a very much larger proportion of workers. There is much significance in that; it indicates the economic apple is sound, though there may be a few specks on the surface (Page 25).

Recipe for Machine-cast Iron

To eliminate breakage in machine-cast iron is simple. Spray the hot empty molds with a heavy coating of lime and salt, and allow the molten iron in the molds to cool in transit to about 1600 degrees Fahr. before subjecting it to water spray. Moreover, the surface condition and appearance of the pigs are greatly improved (Page 60). . . . Magnetic testing of metals is known to be susceptible to errors and apparent nonconformities which are difficult to explain. To minimize this troublesome condition, proper balance of induction systems and a high selectivity will be found useful (Page 48). . . . Eccentric bearings for automobile steering mechanisms possess better wearing qualities when made by machining blanks cut from special rolled sections, supplanting former methods of machining and coining. The new process entails special machines and fixtures (Page 53).

Macaulay Made a Forecast for 1930

For inspiration read Lord Macaulay's "A single breaker may recede, but the tide is coming in," with which he rebuked the short-range pessimists at the bottom of a wave in 1830 (Page 36). . . . The English essayist, impressed with the truth of everlasting upward progress, saw not only much to encourage his countrymen of the times, but looked ahead 100 years—to 1930—through rose-tinted spectacles. His forecast, fantastical as it seemed in his day, proves woefully conservative in this. . . . Steel mill equipment builders predict a good year for 1931, holding to their estimate $50,000,000 to $75,000,000 will be expended in the near future by large steel companies (Page 33). . . . Pittsburgh is a whispering gallery of rumors concerning Bethlehem's expansion plans, but it is believed nothing will be done until the Sheet & Tube merger situation is cleared up (Page 32) . . . . The European steel entente is not dead yet; members who were preparing to quit Jan. 1 vote to hold their organization intact six months longer (Page 100).

Golf a Seamless Steel Tubing Outlet

Since it first made its commercial appearance two score years ago, seamless steel tubing has enjoyed a wide variety of applications. Bicycle frames once absorbed a considerable proportion of the production, while today such items as steel shanks for golf clubs assist in maintaining demand. The first manufacturer of seamless steel tubing in this country now is making about 250,000 feet each week (Page 43). . . . Two years of successful experimentation have paved the way for the commercial introduction of electrically welded high carbon structural steel tubes. The equipment for manufacturing these tubes is a modification of the Johnston process for electric welding small sizes of tubing (Page 54). . . . Twelve years ago the shipping board was sparing no effort or money to rush ships to completion. This week it accepts a bid of $1 per ton for scrapping 45 of these wartime ships (Page 31), giving work to 300 to 500 men for two years.

Submit Merchandising Methods to X-ray

Hearing of the merit of the X-ray in detecting shrinkage, gas holes and other defects in steel castings, the Steel Founders Society of America has turned the penetrating ray on its merchandising methods and found much to correct (Page 26). Once more, emphasis is laid upon the importance of accurate cost knowledge. . . . Machine shop practice engineers have considered the need for yardsticks to measure the finish, quality and machinability of metals and the progress in establishing and making such yardsticks commercially available (Page 56). Recent progress in the development and use of new high-speed cutting materials is cited. . . . Interest in Ohio river canal projects is renewed in the Pittsburgh and Youngstown districts, with the rival centers urging the routes most favorable to them (Page 33).

Lamont Says 1930 Compares With All But 1929

THE most comprehensive measure of the volume of industrial production in the fiscal year ended June 30, 1930, is the general index of output of manufactured and mineral commodities compiled by the federal reserve board," states the annual report of the secretary of commerce, Robert P. Lamont.

"With the average of the three calendar years 1923-1925 taken as 100, this index for the year just closed averaged 110, being 6 per cent lower than the fiscal year 1928-29, but slightly higher than any of the three years, 1925-26 to 1927-28, and decidedly higher than in any still earlier year."

Major Economic Indexes

Based on Calendar Years 1923-1925 as 100

Year ended June 30	Manufacturing production	Minerals production	Railroads ton-miles freight	Building contracts 37 states
1920.....	90	82	96	90
1921.....	72	83	90	46
1922.....	75	69	79	74
1923.....	98	93	96	91
1924.....	97	101	97	93
1925.....	99	98	98	95
1926.....	107	99	105	122
1927.....	108	114	111	108
1928.....	106	103	104	116
1929.....	117	111	110	112
1939.....	110	110	104	81

In further economic review Secretary Lamont cites the continued large production of coal and petroleum which boosted the mineral output index. Railroad traffic naturally was affected by the decline in commodities production, but the ton-mileage carried by them in this fiscal year was surpassed in only three other years. Production of electric power failed to show its usual rapid increase.

Hardest hit by the recession in business was construction, which was less than any other year since 1921-22, and over 14 per cent less than the preceding fiscal year. But preparing the stage for low activity this year, the commerce report acknowledges construction had already begun to decline during 1928-29.

Accompanying the year's reduced manufacturing activity was the department of labor's findings on decrease in employment and increase in numbers of part-time wage earners. Yet, practically no cuts in wages have been made by employers as a result of the recession in business.

Standing as this does in contrast with the practice in previous similar depressions, "it marks the widespread conviction that permanent progress in prosperity is dependent on liberal wages and consequent large buying power on the part of the masses of the people, and that recovery from any temporary setback will be promoted by the same policy."

The considerable decline in prices during the past fiscal year was pointed out to be shared by all three of the great groups of commodities: Farm products, manufactures and minerals. The reduction hit the first named hardest, but in general was much less precipitous than that which occurred in 1921. The decline of prices in the United States is admittedly part of a wide-world movement.

Normal Business Trend Upward, Says Schwab

Charles M. Schwab, chairman of the Bethlehem Steel Corp., Bethlehem, Pa., and president of the Pennsylvania Society of New York, said the present business depression is less severe than the one of 1893, in presiding at the society's dinner in New York, Dec. 13.

"The normal trend of this country must be onward and upward," said Mr. Schwab. "None of us has been obliged to reduce the daily wage and we're not going to. The steel industry will maintain the living scale of its men. We've modernized our ideas —and that's a modern idea.

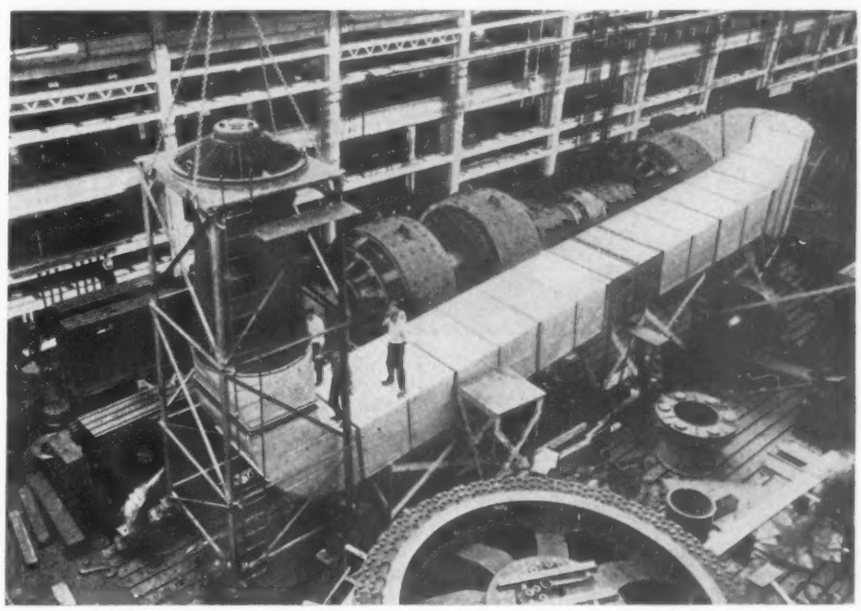
"We have been passing through troublous times and difficulties. But the United States will emerge victorious, as it always does.

"Steel is a barometer of business. In 1921 steel did not rise above 27 per cent of normal production at any time during the entire year. Not once this last year has production of steel fallen that low.

"I've seen five or six periods of business depression. The worst was in 1893. It looked as if we never would get back to normal business. But this country is bound to require the output of our mines and our mills, just as it has in the past."

The Business Week in Washington

Senator McKellar, Democrat, of Tennessee, has introduced a resolution in the senate calling for an investigation by the judiciary committee of the senate of the Sherman antitrust and Clayton acts to ascertain if they are being violated. The



Wide World Photo

BLOWING A TRAINLOAD OF AIR PER MINUTE

A new propeller type of fan is being lowered to an air duct in a test aisle at the East Pittsburgh works of the Westinghouse Electric & Mfg. Co. When connected it will blow a blast of air equivalent to that displaced by a ten car train. The rush of air will cool during test the most powerful motors ever applied to a single pair of rolls in a steel mill

resolution has been referred to the judiciary committee.

□ □ □

Col. Arthur Woods, chairman of the President's emergency committee for employment, announces that Harvard and the Universities of Chicago and Michigan will spend $25,000,000 on building construction.

□ □ □

Frank McManamy has been elected chairman of the interstate commerce commission, effective Jan. 1, pursuant to the policy of the commission of rotation of office.

□ □ □

First naval construction program presented to congress since the London conference calls for construction costing $135,635,000 in fiscal year beginning next July 1. Two cruisers, twelve destroyers, four submarines and one airplane carrier are included. Senate has authorized modernization projects on three battleships to cost $30,000,000.

□ □ □

Employment and farm loan bills are held up in congress: President Hoover's measure for federal construction, now $116,000,000, because of opposition to giving him full control in its administration; $60,000,000 for farmers' relief because of the administration's insistence the amount be cut back to $30,000,000, and "food for humans" eliminated.

World Trade Is Lower by 8 Per Cent But Manufacturers Hold Their Gains

MOST noteworthy in foreign trade throughout the world in 1930 has been the part contributed by the manufacturing industry. With few exceptions, manufactured goods of all kinds continue to circulate in approximately the same volume as in previous years. The decreases in the world's export trade this year have been almost entirely in the countries which produce chiefly raw materials.

So states the National Foreign Trade Council, New York, reviewing world trade for 1930.

For the first time in nine years, the steady growth of international commerce has been interrupted by a net decrease in 1930 of approximately 8 per cent in the volume of the world's export trade.

Yet, in spite of this downturn, world exports still are about 16 per cent greater in volume than they were in 1925. Reports for 11 months this year indicate a yearly total of exports of 101 nations at about $22,500,000,000, compared with $24,500,000,000 in 1929, both figures being reduced to the common index of 1913 prices.

The Foreign Trade council further points out in its analysis that Europe's exports have been less affected by the present depression than those of any other section of the world, the outstanding element in this progress being the rehabilitation of Germany since 1925.

United States exports have declined from 1929 by approximately 15 per cent, yet are still 35 per cent greater in volume than before the war and about even with 1926. An encouraging feature is that with the omission of the automotive industry, exports of finished manufactured goods have been maintained at more than 92 per cent of the volume of the same months last year.

Cite Raw Material Surplus

"The present decrease in exports, among the countries producing large surpluses of raw material, has followed a period of unusual expansion of production in many of these countries, which has culminated this year in a severe reduction of the prices of many basic products," the council's report points out, . . . "and surpluses in these products have appeared not merely because of their increasing production, but because of other factors of increasing influence. The wide use of reclaimed iron and steel scrap is one phase of economy that has resulted from extensive experimentation. The greater employment of rustless steel, increasing durability of road construction are other factors of another phase of modern industry tending to keep products in longer use.

"The mere increase of production could not have brought about the price recessions of the present year, had not some or all of these additional factors operated. World prices are lower, meanwhile, than at any time since the war; even lower than in 1921."

American Rolling Mill Jobbers Meet

MEMBERS of the Armco Distributors Association of America held their seventh annual meeting at Middletown, O., Dec. 4-5. Quincy W. Wales, Brown-Wales Co., Boston, was re-elected president of the association for 1931; A. J. Luedke, Milcor Steel Co., Milwaukee, was elected vice president and George O. M. Johnston, McClure-Johnston Co., Pittsburgh, was re-elected secretary-treasurer. J. H. Christman is retiring vice president.

The new executive committee includes: Mr. Wales; Bruce Haines, of Hammond Sheet Metal Co., St. Louis; A. W. Howe, of J. M. & L. A. Osborne Co., Cleveland; and J. L. McKewin, of Farwell, Ozmun, Kirk & Co., St. Paul.

Mr. Leudke, Mr. Howe, and Guy P. Bible, of Horace T. Potts Co., Philadelphia, were elected members of the board of directors. Other members of the board are Mr. Wales; O. J. Arnold, Arnold & Co., Baltimore; Mr. Haines; H. B. Thompson, Conklin Tin Plate & Metal Co., Savannah, Ga.; Mr. Johnston; Mr. McKewin; and G. F. Ahlbrandt, American Rolling Mill Co., Middletown, O.

Report Merger Dropped

Cleveland—Merger negotiations between the Corrigan, McKinney Steel Co., Cleveland, and the Newton Steel Co., Youngstown, O., with plants at Newton Falls, O., and Monroe, Mich., are understood to have been dropped, for one reason on account of the business situation. The Corrigan, McKinney company is a producer and the Newton Steel Co. a consumer of sheet bars.

«Key» Relief Bills Delayed by Congressional Debates

WASHINGTON — Though emergency relief bills now pending in congress total more than $4,500,000,000 the fact is no definite and final action has been taken on any of them as yet, even on President Hoover's principal measure. The President's bill for public construction—reduced by congress to $116,000,000—is being delayed by the senate's opposition to granting him full power in the administration of the fund.

The senate and house conferees considering the bill as passed last week agreed to eliminate the senate's amendment removing the President's authority to transfer allocations from one group of construction projects to another as he desired. When this action was reported to the senate a storm of protest was raised.

For the first time at this session, a Republican leader, Senator James E. Watson, Indiana, defended President Hoover's plan for emergency relief. He quoted Col. Arthur Woods, chairman of the President's emergency employment committee, as saying that local committees would care for all distress.

Few Industrial Disputes

Action on the bill for $60,000,000 for drought relief is being delayed by administration leaders in the house, who would cut the amount in half. As the bill was passed in the senate, $60,000,000 would be made available to the secretary of agriculture to be loaned for the purchase of seeds, fertilizers, feed for livestock, and food for humans. This last clause "food for humans" is a stumbling block, some members believing that it should be eliminated and the amount reduced; others that it should be eliminated but the full amount allowed.

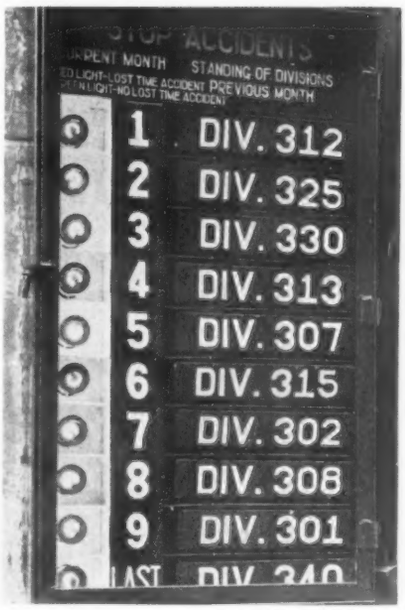
In discussing the employment situation in his annual report Secretary of Commerce Lamont calls attention to the fact that "for the first time in our entire history we have passed through a depression period without experiencing serious industrial disputes."

"Strikes and lockouts," he points out, "during the past several months have been so few in number as to be almost insignificant. At the end of September—the last month for which complete records are available—only 48 strikes involving less than 15,000 workers were actually in existence. During the first six months of this year only 313 disputes were recorded by the department of labor."

The secretary states further that "during the first six months of 1921 over 1600, or more than five times as many disputes, were recorded; many of the individual strikes involving thousands and in some cases tens of thousands of workers."

Referring to the building programs of the country Mr. Lamont calls attention to the fact that "in this program the federal government has contributed an important share. Federal expenditures for construction of all kinds will exceed half a billion dollars for the year resulting in the direct employment of between 100,000 and 200,000 men."

Colonel Woods announced that more than $25,000,000 worth of building construction is either under way or will be started within the next few months at Harvard, the University of Chicago and the University of Minnesota. In the belief that accelerated building programs in the field of public service institutions such as colleges and universities will do much for the relief of unemployment. Colonel Woods has communicated with the presidents of more than 250 of the larger institutions.



AN UP-TO-DATE SAFETY BOARD

This new safety board in use at the Westinghouse Lamp Co.'s plant, Bloomfield, N. J., keeps a running record of accidents. Each division is indicated by a number, each division being placed in succession according to its standing at the close of the preceding month. At the left side of the board small incandescent lamps indicate lost-time accidents occurring during the current month. Green lights indicate no lost-time accidents; red lights indicate one or more lost-time accidents.

Companies Operating at 86.8 Per Cent of Normal

A survey of employment conditions among members of the National Association of Manufacturers, as of Dec. 1 reveals:

That 939 companies with 477,499 persons on their payrolls are operating at 86.81 per cent of normal capacity.

That 216 of these companies have increased their payrolls since July 1 from 77,348 persons to 88,062.

That 176 of these companies have maintained their payrolls of 35,266 persons all through the summer and into the winter without any decreases.

That 547 companies have been forced to cut down their payrolls from 393,623 in July to 354,171, or a drop of 39,452 workers.

That the 939 companies as a group, with 506,237 on the payrolls July 1 are operating with 477,499, or a decline of only 28,738 workers or 5.67 per cent.

That these companies in July and through the summer carried 25,426 persons or 5.02 per cent more than actually needed to meet the consumer demand and today they are carrying 20,670 workers or 4.32 per cent more than required to fill current orders.

"Taking all things into consideration," says John E. Edgerton, president, in announcing the result of the survey, "the conclusion is inescapable that most of the blame for our tardy recovery is to be found at the door of the consuming public which has retrenched too heavily. A fear complex is holding back industry."

Steel Employment Shows Slight Drop for November

Washington—Employment in the iron and steel industry declined 1.9 per cent in November compared with October, according to the bureau of labor statistics. Cast iron pipe employment also fell off. Employment in foundries and machine shop products dropped 3.3 per cent, and ship building employment 5.8 per cent.

Employment in manufacturing industries in November as a whole decreased 2.7 per cent compared with October, and payroll totals decreased 6.1 per cent.

Youngstown Wage Drops

Youngstown, O.—Wages paid in the Youngstown industrial district in November totaled $5,693,609, a decrease of 7.6 per cent from the October disbursement. With the exception of

January, 1930, the November payment was the smallest for any month in the past three years.

Employment Guarantee Is Extended to Lamp Works

A plan whereby employes of the General Electric Co.'s incandescent lamp works will be guaranteed at least 30 hours' work in a week, 50 weeks a year, effective Jan. 1, 1931, is announced by Gerard Swope, president. Lamp works are located in 12 cities and employ about 8000. The employes in two years' service are eligible, upon acceptance by 60 per cent of them.

The incandescent lamp works did not come under the provisions of the plan announced in June for stabilization of employment and relief of the unemployed, which now is functioning. Similarly, lamp works employes will pay 1 per cent of weekly earnings into a fund, to which the company contributes a like amount. Full payment for 30 hours' work will be made whenever employment falls below that number of hours in a week.

Jenkins' Merger Decision Expected to Be Delayed

Youngstown, O.—Judge David G. Jenkins, judge in the Bethlehem-Sheet & Tube merger injunction lawsuit, now appears unlikely to announce his decision until February or March. Legal circles here believe that the judge will be unable until late January to read the voluminous record of 8000 typewritten pages of testimony, nearly 1000 exhibits, four huge briefs and look into the several hundred legal citations used in the arguments. The transcript now is being edited here by Henry Crawford, of Eaton counsel, and John W. Ford, of Sheet & Tube counsel, who are correcting stenographic errors in the record.

While Judge Gessner, also of Mahoning county, has set Jan. 12 as the date for a hearing in which he is asked under the Ohio law to set a fair cash price for the Sheet & Tube common stock held by dissenting stockholders, it appears probable he will postpone this hearing until Judge Jenkins announces his finding.

The fifth death among those associated with the merger trial occurred last Saturday when John Garabarino, bailiff in Judge Jenkins' court was stricken.

Pennsylvania Concludes Short-Haul Rate Hearing

Hearings have been concluded by the public service commission of Pennsylvania at Harrisburg, Pa., on the complaint of steel manufacturers in western Pennsylvania against the new short haul rates which became effective May 20 in conformity with the interstate commerce commission decision decreeing that freight rates on iron and steel products should be on a mileage basis.

Steel producers of western Pennsylvania would have the old rates restored, claiming that the interstate commerce commission's decision is not binding upon the Pennsylvania commission. The railroads favor retention of the new rates. Steel producers in eastern Pennsylvania oppose giving producers in western Pennsylvania lower rates without extending the benefit to the eastern part of the state.

Steel Founders To Strive for Better Merchandising Methods; Hear of X-ray

BETTER merchandising methods for steel castings, in which lax selling price structures were scored, was the general theme of sessions of the Steel Founders' Society of America, Inc., at Hotel Sherman, Chicago, Dec. 10-12. Steps were taken to promote a more general adoption of the society's new accounting and cost plan.

It was voted that the society proceed with a survey to determine the distribution by classes of sales of steel castings shipped in the last previous normal year by states and by industrial fields. A separate study, identical in scope, is to be carried on for the heat and corrosion resistant alloy castings, and regular reports are to be made. It is intended to present a complete picture of the geographical sales of castings as well as their use in industrial groupings, with the aim of simplifying some of the merchandising problems.

About 35 foundries reported October operations below 50 per cent, of which about nine found activity better either in November or December, or both. Eleven reported some reductions in the last two months. About seven reported operations above 90 per cent, while 40 reported a fair outlook ahead, several a good outlook, and about 20 a poor outlook at least for the immediate future.

Arthur Simonson, Falk Corp., Milwaukee, spoke with force on poor management and selfishness that permits disastrous price structures, spelling trouble for any industry. He stressed the importance of accurate cost knowledge.

"For at least the time being we need to forget about the excess capacity that exists and base the cost of operating our plants on a figure approaching 50 per cent," he said. "If we base our costs upon some theoretical percentage of operations instead of that which actually exists, we are only fooling ourselves."

Dr. Ancel St. John, president of the St. John X-Ray Service Corp., New York, spoke on X-ray inspection in metal industries, describing the technique of detecting shrinkage, gas holes, slag and sand in castings, and also covering inspection of welds.

The large castings division held a forum on the best method to interest the group in putting into service generally the accounting and cost plan of the society, adopted last February. Profits per dollar necessary in the large castings business also were considered. It was pointed out that about a dozen in the membership have added the society's cost system, which is being installed in 6 to 12 weeks, and that the system actually is representative of production conditions.

Sun Governs Plant Shifts

Not only will the new plant of the Simonds Saw Co., Fitchburg, Mass., be unique architecturally, but in order that the worker will not be entirely deprived of natural sunshine one shift will work during the morning hours and another during afternoon hours. All light and ventilation in the new windowless building is artificial.

The first shift, it has been tentatively decided by Thomas F. Howarth, vice president, will work from 6 a.m. to 2 p.m. followed by a group of workers from 2 p.m. to 11 p.m.

Algoma Rail Mill Down

Algoma Steel Corp., Sault Ste. Marie, Ont., has closed its rail mill temporarily while machinery for rolling of heavier rails is installed. It is proposed to resume operations about Feb. 1, when it is anticipated large orders will have been received from the Canadian Pacific railway for 130-pound rails for its coast lines.

Radiator Prices Advanced

New York—American Radiator & Standard Sanitary Co. has announced a 5 per cent increase in prices, effective at once, on radiators, boilers and enameled ware. The same increase is announced by the Richmond Radiator Co.

Unfilled Steel Orders in Year's Largest Gain

Unfilled orders on the books of the United States Steel Corp. increased for the second consecutive month when, on Nov. 30, a gain of 157,873 tons was shown, making unfilled orders total 3,639,636 tons. This increase of 4.5 per cent, is the largest since December, 1929, and undoubtedly reflects large rail tonnage. Monthly comparisons of unfilled orders follow:

Date	Total	Change, tonnage	per cent
1929			
Jan. 31	4,109,487	132,775+	3.34+
Feb. 28	4,144,341	34,854+	0.84+
Mar. 31	4,410,718	266,377+	5.70+
April 30	4,427,763	17,045+	0.38+
May 31	4,304,167	123,596—	2.88—
June 30	4,256,910	47,257—	1.10—
July 31	4,088,177	168,733—	3.90—
Aug. 31	3,658,211	429,966—	10.50—
Sept. 30	3,902,581	244,370+	6.68+
Oct. 31	4,086,562	183,981+	4.71+
Nov. 30	4,125,345	38,783+	0.95+
Dec. 31	4,417,193	291,848+	7.74+
1930			
Jan. 31	4,468,710	51,517+	1.20+
Feb. 28	4,479,748	11,038+	0.25+
Mar. 31	4,570,653	90,905+	2.03+
April 30	4,354,220	216,433—	4.73—
May 31	4,059,227	294,993—	6.78—
June 30	3,968,064	91,163—	2.24—
July 31	4,022,055	53,991+	1.36+
Aug. 31	3,580,204	441,851—	10.9—
Sept. 30	3,424,338	155,866—	4.35—
Oct. 31	3,481,763	57,425+	1.68+
Nov. 30	3,639,636	157,873+	4.53+

Boiler Orders Decreasing

October orders for 1189 steel boilers were under the September total for 1254 units, according to 81 manufacturers, comprising most of the industry reporting to the bureau of the census. October orders were for 852,022 square feet, September for 1,282,388 square feet. For ten months of 1930, orders for 11,575 boilers of 12,174,015 square feet have been placed; in comparison 1929: 16,258 orders for 17,428,116 square feet.

Weekly Coal Output Rises

Total production of soft coal during the week ended Dec. 6 is estimated at 9,627,000 net tons, which compared with the output in the most recent full-time week, Nov. 17-22, shows an increase of 737,000 net tons, or 8.3 per cent. To date, 1930 aggregates 431,540,000 net tons, against 1929's 497,980,000 tons in the like period.

Steel Furniture Increasing

October shipments of steel furniture stock goods, as reported to the bureau of the census by 34 manufacturers in the business group, totaled $1,900,865, compared with $1,879,151 in September. New orders in this grouping likewise showed a gain for the month, as did both shipments and orders in the shelving classification, according to the following monthly tabulation:

	Business Group		Shelving	
	New orders	Shipments	New orders	Shipments
	(In Dollars, 000 omitted)			
1929				
Oct.	2,842	2,983	927	979
(10 mos.)	28,553	28,686	10,018	9,606
Nov.	2,900	2,631	801	859
Dec.	2,583	2,781	735	856
(Year)	34,036	34,038	11,554	11,322
1930				
Jan.	2,886	2,890	724	674
Feb.	2,370	2,549	758	682
March	2,627	2,726	839	812
April	2,523	2,427	796	814
May	2,310	2,342	725	751
June	2,006	2,168	699	705
July	1,840	1,811	596	604
Aug.*	1,788	1,985	526	555
Sept.*	1,795	1,879	512	497
Oct.	1,855	1,901	547	592
(10 mos.)	22,003	22,682	6,724	6,689

*Revised.

Machine Tool Orders Drop to Low for Six Years

Index of machine tool orders for November dropped to 60.4, a low for six years, causing the three-month trend line for all classes to dip to 95.5. Lows were registered in each classification. Shipments also dropped to a new low point in November at 67 for all reports. Low rate of shipments keeps unfilled orders at a comparatively high level, 229.9, which is less than one month's capacity, according to the National Machine Tool Builders' association, Cincinnati. Three-month averages of orders follow:

1929	*Index A	*Index B	*Index C	Total
Nov.	250.8	235.7	261.2	247.2
Dec.	224.0	212.7	258.3	222.1
1930				
Jan.	173.8	171.9	226.8	175.4
Feb.	170.3	169.1	213.6	172.6
March	172.8	184.0	219.7	177.8
April	167.6	197.7	214.4	176.8
May	155.2	191.2	195.3	165.1
June	137.6	171.6	169.4	146.7
July	106.6	146.5	146.9	117.3
Aug.	100.8	137.0	138.0	110.2
Sept.	103.5	139.0	156.0	113.6
Oct.	104.4	135.0	151.0	113.3
Nov	89.0	106.3	143.5	95.5

*Note—Index A, base over $50,000; Index B, base $10,000 to $50,000; Index C, base less than $10,000. Base: average shipments for years 1922-23-24. Totals: The total of all reports is not an average of A, B and C, but the sum of each item in percentage of the total base.

Fifty-five per cent of 1929 revenue tonnage of Class 1 railroads originated from products of mines, 25 per cent from manufactures, 8 per cent from agriculture.

Structural Steel in Gain

Bookings of structural steel came back strongly in October, the total being 215,600 tons representing 53.9 per cent of the industry's capacity, compared with 162,000 tons in September and 212,135 tons last October. Shipments in October, however, were slightly below both September and October, 1929. These statistics, like the following, are computed by the department of commerce from reports by fabricators representing 81 per cent of the fabricating industry:

	Bookings		Shipments	
1929	Tonnage	Per cent capacity*	Tonnage	Per cent capacity*
Oct.	319,550	83.0	323,785	84.1
(10 mos.)	3,088,085	80.2	3,796,640	72.6
Nov.	212,135	55.1	263,725	68.5
Dec.	297,605	77.3	246,400	64.0
(Year)	3,597,825	77.9	3,306,765	71.6
1930				
Jan.	248,800	62.2	241,600	60.4
Feb.	278,800	69.7	295,200	73.8
March	246,800	61.7	278,400	69.6
April	232,000	58.0	298,800	74.7
May	290,800	72.7	279,200	69.8
June	263,600	65.9	296,000	74.0
July	282,800	70.7	291,200	72.8
Aug.	264,000	66.0	277,600	69.4
Sept.	162,000	40.5	258,400	64.6
Oct.	215,600	53.9	253,600	63.4
(10 mos.)	2,485,200	62.0	2,770,000	69.2

*Capacity: 1928 and 1929—385,000 tons; 1930—400,000 tons.

Barrel Output Again Up

October's production of steel barrels was 616,121 barrels, or 44.1 per cent of capacity, against 564,927 units, or 40.3 per cent in September. Monthly figures from the bureau of the census reports by 27 companies operating 32 plants follow:

1929	Production	Shipments	Unfilled orders within 30 days
Oct.	629,976	638,681	298,572
(10 mos.)	7,141,013	7,131,266	.....
Nov.	572,621	567,257	285,295
Dec.	624,365	619,058	302,052
(Year)*	8,337,999	8,317,581	.....
1930			
Jan.	650,764	643,120	304,354
Feb.*	604,709	599,324	313,349
March*	771,686	785,951	417,933
April	769,061	766,617	322,161
May	731,087	736,147	393,843
June	651,559	638,358	319,754
July	617,420	621,091	311,630
Aug.	553,842	552,265	237,745
Sept.	564,927	565,204	253,745
Oct.	616,121	619,558	275,778
(10 mos.)	6,531,176	6,527,635	.....

*Revised.

A portion of the plant formerly occupied by National Iron & Wire Co., 3901 Hamilton avenue, Cleveland, has been leased by the McNeal Co., steam shovel dealer and rebuilder, moving from 5046 Lakeside avenue.

Industrial Men in the Day's News

R. S. Archer, Director of Metallurgy, A. O. Smith Corp.

FOR ten years past he has been with Aluminum Castings Co. and Aluminum Co. of America, as research metallurgist.

PREVIOUS experience was with Detroit Edison Co., Detroit, and the bureau of aircraft production.

MORE than 25 papers and theses, and one book, "Science of Metals", have commanded attention during the past dozen years.

RESIGNING recently as research metallurgist for Aluminum Co. of America and Aluminum Castings Co., Cleveland, after a 10-year connection, Robert S. Archer has been appointed director of metallurgy for A. O. Smith Corp., Milwaukee, manufacturer of electric weld steel pipe, automobile frames and other products. Since 1919 his work has been concerned chiefly with the development of heat treated aluminum castings and new wrought alloys of high strength as well as the application of alloys and metallurgical processes.

Metallurgy has always been Mr. Archer's forte. He specialized in that subject during college. After receiving his early education at Cass Technical high school, Detroit, he was graduated in 1916 from the University of Michigan in chemical engineering and obtained his master of science degree a year later on his thesis, "Annealing of Malleable Castings," on which he collaborated with A. E. White. This was published in the transactions of the American Foundrymen's association in 1918. Since then more than 25 papers and theses have come from his pen. In 1924 his book, "Science of Metals," in the preparation of which Dr. Zay Jeffries collaborated, was published.

After graduating from college Mr. Archer became research engineer for Detroit Edison Co., Detroit, 1916-17. In 1918 he was research metallurgist in the bureau of aircraft production, and the next year he became identified with Aluminum Castings Co., as research chemist and then was appointed research metallurgist for Aluminum Co. of America, resigning Dec. 1, 1930.

He is a member of American Institute of Mining and Metallurgical Engineers, being a member of the executive committee of ith Institute of Metals division; American Society for Steel Treating, being a member of its recommended practice committee and chairman of its nonferrous data sheet committee; American Society for Testing Materials, Institute of Metals of Great Britain, Cleveland Engineering society and other technical organizations, as well as numerous clubs. Under Mr. Archer's direction was prepared the 120-page nonferrous section of the National Metals Handbook of American Society for Steel Treating.

J. E. HART, general superintendent for seven years of Walworth Co., Boston, has been made works manager. Previously he was with the Kewanee, Ill., plant of the company, then known as Western Tube Co., as clerk in the pipe finishing department. Three years later the Western company purchased the well point business of Scott Well Point Co., Chicago, which placed Mr. Hart in charge of well point work. In 1907 his supervision was extended to nipple and radiator departments, and when in 1917 the Walworth Co. acquired the Western company he became a part of the Walworth organization. In 1920 he had charge of the rating department, Kewanee works, and later was assistant supervisor of planning work. In 1923 he went to Boston and soon became general superintendent.

Chester L. Erickson, formerly assistant to the general superintendent, Walworth Co., Boston, has been appointed superintendent of production.

J. Frank Dorney, formerly supervisor of rating and methods division, Walworth Co., has been appointed assistant to the works manager at Boston.

□ □ □

Martin Brockmann, for the past 16 years in charge of the foundry division, Cincinnati Milling Machine Co., Cincinnati, has resigned to become superintendent of John B. Morris Foundry Co., Cincinnati. Mr. Brockmann's associates presented him with an engraved gold watch as a token of their esteem.

□ □ □

Cloyd M. Chapman, consulting engineer, New York, Dec. 11 was reelected vice president of American Standards association, New York, for 1931 and also was elected chairman of the standards council of that organization. He also was elected a director of the association for 1931 with nine others, including Quincy Bent, vice president, Bethlehem

Steel Co., Bethlehem, Pa.; C. L. Collens, president, Reliance Electric & Engineering Co., Cleveland, Howard Coonley, president, Walworth Co., Boston, and C. E. Skinner, assistant director of engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

□ □ □

R. G. Olson, manager of the Milwaukee branch of American Blower Co., has been promoted to manager of its Cleveland branch.

□ □ □

Lee E. Allen, chief engineer and secretary, Pennsylvania Engineering Works, New Castle, Pa., has been elected president of the Engineers' Society of New Castle.

□ □ □

E. J. Kearney, secretary-treasurer of Kearney & Trecker Corp., Milwaukee, machine tools, has been appointed representative of industry on the Wisconsin State Educational board.

□ □ □

Herbert M. Wilcox, operating manager of Electrical Research Products Inc., a wholly owned subsidiary of the Western Electric Co., New York, has been elected a vice president.

□ □ □

John H. Morrison, vice president and general sales manager of Warren Foundry & Pipe Co., Phillipsburg, N. Y., sailed Dec. 13 for an 8-week combined business and pleasure tour of the British Isles.

□ □ □

C. E. Skinner, assistant director of engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been nominated for president of American Institute of Electrical Engineers, 33 West Thirty-ninth street, New York.

□ □ □

T. G. Whitcomb, who for eight years was assistant to the late James A. Whitcomb, president and manager, Whitcomb Wheel Co., Kenosha, Wis., whose death was noted in STEEL of Oct. 30, has recently been appointed to fill the vacancy.

□ □ □

E. P. Ogden and F. G. Gibson sailed Dec. 16 for soviet Russia to become part of the organization of engineers which Freyn Engineering Co., Chicago, is maintaining in connection with the design and construction of a steel plant at Kuznetsk, Siberia.

□ □ □

Prof. John C. Olsen, head of the department of chemistry and chemical engineering at Polytechnic Institute of Brooklyn, Brooklyn, N. Y., was elected president, American Institute of Chemical Engineers at its twenty-third annual meeting, New Orleans, Dec. 8 to 10.

□ □ □

Walter F. Graham, formerly with the Ohio Brass Co. and American Mond Nickel Co., has been appointed technical director of Caskey Brass & Bronze Works Inc., Philadelphia, specializing in the production of nickel, nickel alloy and special nonferrous castings. The company also is agent of International Nickel Co.

□ □ □

R. W. E. Moore, engineering manager of association activities, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., was presented the James H. McGraw award, manufacturer's medal and purse for 1930 at the annual meeting of the National Electrical Manufacturer's association at Old Point Comfort, Va., recently. He was a member of the committee of the Electrical Manufacturer's council and since April, 1927, has been chairman of the casualty and fire prevention committee, National

R. W. E. Moore

Electrical Manufacturer's association. The award was made for Mr. Moore's constructive contributions to the advancement of the manufacturing branch of the electrical industry in the way of making electrical wiring and equipment less hazardous.

□ □ □

S. H. Taylor Jr. has been given charge of the Los Angeles offices, at 812 Mateo street, of Lincoln Electric Co., Cleveland. He succeeds W. S. Stewart, who has been appointed district manager of Cleveland territory.

L. P. Henderson has been made manager of the San Francisco office. E. J. Pfister, formerly of the Philadelphia and Allentown, Pa., offices, has been transferred to Kansas City as district manager with offices at 405 R. A. Long building, Kansas City, Mo.

D. C. Anderson continues in charge of the Philadelphia office, moved to Commerce building, that city.

□ □ □

J. M. Frank, president of Ilg Electric Ventilating Co., Chicago, has been elected president of the National Association of Fan Manufacturers.

□ □ □

Ashton G. Bean, president of Bishop & Babcock Mfg. Co., Cleveland, compressors, valves, etc., was elected president of White Motor Co., Cleveland, to succeed Robert W. Woodruff, who becomes chairman of the board.

□ □ □

James A. Fisher, assistant district sales manager at New York, for Wheeling Steel Corp., Wheeling, W. Va., has been appointed Philadelphia district sales manager, to succeed L. J. Lowe, who will be transferred to the New York office.

□ □ □

C. R. Messinger, president, Chain Belt Co., Milwaukee, also will become president of Oliver Farm Equipment Co., Chicago, effective Jan. 1.

Joseph D. Oliver will continue as chairman of the board of the Oliver company, and M. W. Willis, president since its organization, becomes vice chairman of the board.

Financial News of Steel Industry

Cliffs Corp., Cleveland, has declared quarterly dividend of 65 cents on common stock, placing the stock on a $2.60 annual basis, against $4 previously. Dividend is payable Dec. 20 to record Dec. 10.

□ □ □

Republic Steel Corp., Youngstown, O., has passed dividend on cumulative preferred stock payment of which was due Jan. 1.

□ □ □

Arthur G. McKee & Co., Cleveland, have declared regular quarterly dividend of 87½ cents a share on class B shares, payable Jan. 1 to record Dec. 20.

□ □ □

Wellman Engineering Co., Cleveland, has declared regular quarterly preferred dividend of $1.75, payable Dec. 31 to record Dec. 20.

□ □ □

Interlake Steamship Co., Cleveland, has declared dividend of $1 a share payable Dec. 31 to record Dec. 18.

□ □ □

Westinghouse Air Brake Co., Pittsburgh, has declared regular quarterly dividend of 50 cents, payable Jan. 31 to record Dec. 24.

□ □ □

Trumbull Cliffs Furnace Co., Cleveland, has declared regular quarterly dividend of $1.50 on preferred stock, payable Jan. 2 to record Dec. 20.

□ □ □

Vlchek Tool Co., Cleveland, has continued the 50-cent annual dividend

rate by declaring a quarterly disbursement of 12½ cents payable Dec. 31 to record Dec. 20.

□ □ □

Habirshaw Cable & Wire Corp., Yonkers, N. Y., has declared quarterly dividend of 10 cents a share, payable Jan. 2 to record Dec. 1. The corporation had paid dividends of 25 cents quarterly.

□ □ □

Granite City Steel Co., Granite City, Ill., has declared a quarterly dividend of 75 cents a share, placing the stock on a $3 annual basis instead of $4 previously. Dividend is payable Dec. 31 to record Dec. 15.

□ □ □

Scovill Mfg. Co., Waterbury, Conn., has declared dividend of 50 cents a share, payable Jan. 1 to record Dec. 15. Three months ago dividend of 75 cents was paid, prior to which stock was on a $4 annual basis.

□ □ □

Iron Fireman Mfg. Co., Portland, Oreg., announces its intention to increase dividends to at least $1.60 a share annually, beginning with quarterly payment of 40 cents March 1, 1931. Company now pays 25 cents a share quarterly. An extra of 50 cents was paid early in 1930.

□ □ □

Perfect Circle Co., Hagerstown, Ind., reports net profit of $42,258 for October, against net profit of $78,175 for same month of 1929. Ten months of 1930 profit aggregates $570,773, or $3.51 a share; same time of last year totaled profit of $839,259 equal to $5.16 a share.

□ □ □

National Steel Corp., Pittsburgh, based on the balance sheet submitted in a letter to stockholders, will pay the following for Michigan Steel Corp., Detroit, holdings: Bonds, notes, or debentures to be issued by National Steel on such terms as shall be approved by the Michigan Steel directors, $6,062,525; cash, $3,031,275; common stock of National Steel, 60,625 no par shares, or, at the option of Michigan Steel such lesser number of shares as it shall elect to take and an amount in cash equal to $50 per share for each share not taken.

Any Michigan Steel stockholder may, at his option, elect to receive cash in lieu of his distributive share of the stock of National Steel at the rate of $50 a share for each share of National Steel stock which he would otherwise be entitled to receive, provided written notice is given Michigan Steel before Dec. 22.

The terms of the agreement to be voted on Dec. 22 by Michigan Steel stockholders have provided Michigan Steel will distribute to its stockholders for each Michigan Steel share held: $25 in National Steel notes, bonds or debentures at par; $12.50 in cash; and ¼ of one share of National Steel common.

Obituaries

JAMES T. WHITEHEAD, structural steel fabricator and banker, died Dec. 9 at his home in Detroit after an illness of several weeks. Mr. Whitehead at the time of his death was president of the Whitehead & Kales Co., Detroit, vice president of the Kales Stamping Co. and vice president of the Michigan Copper & Brass Co., subsidiary of Revere Copper & Brass Inc., Rome, N. Y.

□ □ □

Edward Zinram, 38, traffic manager, Erie City Iron Works, Erie, Pa., died there Dec. 1.

□ □ □

Charles W. Potts, 53, a member of Horace T. Potts & Co., Philadelphia, and at one time active in that company, died Dec. 4 at Balboa, Canal Zone.

□ □ □

Elmer J. Manning, 63, proprietor of Manning Machine Co., Janesville, Wis., died Dec. 5. He was widely known as an inventor and designer of mechanical devices, especially those pertaining to gasoline engine operation.

□ □ □

Edmond D. McCarthy, 58, president of McCarthy Bros. & Ford, Buffalo, electrical contractors, and secretary of Beals, McCarthy & Rogers, Buffalo, wholesale hardware jobbers, died Dec. 13.

□ □ □

Earl E. Bowden, 32, district sales manager, American Electric Motor Co., Milwaukee, died Dec. 4. Born in Norway, Mich., he located in Milwaukee in 1917 and became associated with the motor company in 1919.

□ □ □

Stanley R. Greene, sales manager, American Fire Clay Co., Cleveland, who died at Columbus, O., Dec. 10, was for 15 years general superintendent of Cleveland Furnace Co., which later was absorbed by Otis Steel Co.

□ □ □

Col. Walter Scranton, 82, one time steel leader, died Dec. 12 at Pasadena, Calif. His father, Joseph Hand Scranton, founded the town of Scranton, Pa., and he himself organized the Scranton Steel Co., and later was president of Lackawanna Steel Co., Lackawanna, N. Y., acquired by Bethlehem Steel Co. in October, 1922 .

□ □ □

Randolph Ortman, 66 formerly president and later board chairman of American Manganese Steel Co., Chicago Heights, Ill., died Dec. 8 at Charlottesville, Va. He was born in Vienna but received his education at Detroit and Saginaw, Mich. From 1893 until 1915 he was assistant treasurer of Griffin Wheel Co., Chicago. He had been president and then chairman of the Ramapo-Ajax Corp., Hilburn, N. Y., He was a director of American Brake Shoe & Foundry Co., New York, and American Forge Co., San Francisco.

□ □ □

Claude M. Dibble, 40, vice president in charge of production, Moore Bros. Co., Joliet, Ill., stoves, furnaces and domestic heaters, died Dec. 14.

□ □ □

Arthur W. Willcuts, assistant manager of railroad sales, Joseph T. Ryerson & Son Inc., Chicago, died suddenly on a St. Louis golf course Dec. 14. He has been associated with the Ryerson organization for many years.

□ □ □

John A. Whyte, 80, instructor at Carnegie Institute of Technology, Pittsburgh, one time friend of Andrew Carnegie when he was employed in the Kloman mills, Thirty-third street, Pittsburgh, died Dec. 8. For a long time he was master mechanic for Jones & Laughlin Steel Corp. He was born in Scotland in 1850 and located in Pittsburgh as a boy.

□ □ □

Maj. James M. Holloway, 63, manager of sales at Kansas City, Mo., for American Steel & Wire Co., Cleveland, died Dec. 3 He had devoted more than 40 years to the iron and steel and hardware industries. He was with the expeditionary forces in Cuba during the Spanish-American war, resigning as treasurer of Adrian, Mich., his birthplace to be captain of a regiment from that city. He returned as major. Major Holloway was a practical iron molder, having been apprenticed as a foundryman in his youth. He had been with American Steel & Wire Co. for about 30 years and held the Gary medal for more than 25 years' service with the United States Steel Corp. He moved from Adrian to Chicago and then to Kansas City his home for the last 20 years. He was especially active in the Kansas City Implement, Hardware and Tractor club.

Machine Works Purchased

Worcester, Mass.—Whitin Machine Works Whitinsville, Mass., has purchased the Fales & Jenks Machine Co., Pawtucket, R. I., and the Woonsocket Machine & Press Co., Woonsocket, R. I. The Woonsocket company will be moved to Whitinsville, consolidating there the manufacture of machines for the production of cotton yarns.

Here and There in Industry

LUDLUM STEEL CO., Watervliet, N. Y., will concentrate all its production at Dunkirk, N. Y., instead of dividing between Dunkirk and Watervliet. Transfer will be started at once and will require about three months. A skeleton organization will be maintained at Watervliet to carry on production in periods of peak demand. Frank B. Lounsbury, vice president and manager of the Dunkirk plant, has been appointed general manager of all plants. The main offices will continue at Watervliet.

□ □ □

Canadian Can Co. is utilizing the dull season in December to remove its main plant from Toronto, Ont., to Simcoe, Ont.

□ □ □

A. H. Cohn & Sons and Charles Horewitz, dealers in steel and iron scrap at Butler, Pa., have combined their business under the firm style of the Butler Iron & Steel Co.

□ □ □

Louis Allis Co., Milwaukee, has established its Cleveland office at 305 Union building, 1836 Euclid avenue, in charge of J. R. Patterson and W. F. Glaser.

□ □ □

Industrial Plants Corp., 25 Church street, New York, will conduct a public auction for the sale of a modern experimental machine shop at Fourth and Hanover streets, Pottstown, Pa., Dec. 23.

□ □ □

Samuel T. Freeman & Co., auctioneers, 1808 Chestnut street, Philadelphia, will sell at auction a machine and repair shop at Whitehall and North Fourth streets, Allentown, Pa., Dec. 18, which is part of the plant of the Amalgamated Silk Corp.

□ □ □

Lincoln Electric Co., Cleveland, has moved its Philadelphia office to the Commerce building. Larger space is available for service of welders and motors and for testing arc welded designs. The office is in charge of D. C. Anderson.

□ □ □

General Electric Co., Schenectady, N. Y., has co-ordinated various plastic activities into a new department under R. E. Coleman as manager. It will handle sales, engineering and manufacturing of plastics and will oversee activities at Pittsfield, Mass., Schenectady, N. Y., Fort Wayne, Ind., Erie, Pa., and Lynn, Mass., plants.

□ □ □

Oliver Farm Equipment Co. has resumed full operations at its Battle Creek, Mich., plant. This follows full operations started a week ago at the company's Hart-Parr tractor plant at Charles City, Iowa. Operations at the South Bend, Ind., and Springfield, O., plants continue on a modified scale. Renewed operations follow the recent financing.

□ □ □

Forker Co., Cleveland, has been formed by J. Bentley Forker Jr., who has resigned as southeastern district manager for the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O. The company plans to manufacture materials handling equipment, cranes and tramrail equipment.

□ □ □

Metalware Corp., Two Rivers, Wis., manufacturing kitchen utensils and other drawn ware, merchanical toys and electrical appliances, has increased its capital from $350,000 to $400,000 to accommodate the growth of its business since the last increase, from $300,000 to $350,000, in 1926. Remus Koenig is president, and William Halberg, secretary.

□ □ □

Jamestown Metal Desk Co., Jamestown, N. Y., has booked two contracts for hollow metal doors, interior trim and elevator enclosures providing sufficient volume to assure full time operation well into second quarter. One contract is for the new building of the New York Trust Co., New York, and the other for the new building of the New York Telephone Co., New York.

□ □ □

Alco Products Inc., a subsidiary of the American Locomotive Co., formed to design and manufacture oil refining equipment, occupying part of the parent plant at Dunkirk, N. Y., has leased the thirteenth floor at 220 East Forty-second street, New York, for its offices. Offices of the American Locomotive Co. will remain at 30 Church street, New York.

□ □ □

Railway & Power Engineering Corp., 171 Eastern avenue, Toronto, Ont., has been given exclusive rights to the manufacture and sale in Canada of products of Ryan, Scully & Co., Philadelphia. The latter company designs and builds industrial heating equipment. The Canadian company has machine shop and foundry developments at Toronto and maintains warehouse and service facilities at several important centers.

□ □ □

Arthur G. McKee & Co., Cleveland, have received a contract from the Great Lakes Pipe Line Co., Ponca City, Okla., to construct seven pumping stations in connection with the new gasoline pipe line from Ponca City, Okla., to Des Moines, Iowa, where the line branches, going to Minneapolis and St. Paul, and also to Chicago. Amount involved in building the stations with their equipment will be approximately $650,000.

□ □ □

Saul Frankel, of the Rochester Iron & Metal Co., Rochester, N. Y., was elected president of the Buffalo chapter of the Institute of Scrap Iron and Steel, Buffalo. Sloan Hurwitz, Hurwitz Bros. Iron & Metal Co., Buffalo, was elected chairman of the executive committee. Other officers elected include: Louis L. Hurwitz, Hurwitz Bros. Iron & Metal Co., Syracuse, N. Y., first vice president; Sol Morrison, Morrison & Risman Co., Buffalo, second vice president; Terry Hanlon, Hausman & Wimmer Co., Buffalo, third vice president; John E. Farrell, Buffalo, secretary; and Harry Roblin, Buffalo Housewrecking & Salvage Co., Buffalo, treasurer.

The executive committee, in addition to the officers and Sloan Hurwitz, consists of the following: Charles Bock, M. Bock & Son, Buffalo; David Falk, Falk Iron & Metal Co., Rochester; N. H. Jacobs, Buffalo Housewrecking & Salvage Co.; Abe E. Nathan, Utica, Max Pressler, The Joseph Schonthal Co. Inc., Buffalo; Max Rosenberg, Benstock & Rosenberg Bros. Inc., Buffalo; Philip Roth, B & R Iron & Metal Co., Syracuse; and Henry Zacks, Erie Iron & Steel Co., Erie, Pa.

Unemployed Scrap Ships

Forty-five steel cargo vessels that once couldn't be made fast enough for the United States shipping board in the feverish shipbuilding days of 1917 may soon be affording work to those same high-priced shipbuilding hands of a decade ago.

The 45 were sold recently for dismantling at $1 a ton, on condition from the board that they be immediately scrapped to give work for 300 to 500 unemployed over the next two years.

Union Shipbuilding Co., Baltimore, was successful bidder at $384,960 for 357,560 tons involved. Twenty-two of the ships are at Norfolk, Va., 16 at New York and 7 at Philadelphia.

F. o. b. PITTSBURGH

PITTSBURGH

MERGER rumors again are being circulated freely in the Pittsburgh district, several important local steel companies being mentioned as possible subsidiaries of the Bethlehem Steel Corp.

On the supposition that smoke is produced by fire, some credence is attached to these reports, although it is not unlikely that to one conflagration is being attributed more smoke than it deserves.

This is the acquisition by Bethlehem of the McClintic-Marshall Co., Pittsburgh, one of the two largest structural fabricators of the country, regarding which an announcement is expected shortly.

There arises some question whether or not Bethlehem would seek a source of steel supply in the Pittsburgh district in order to accommodate McClintic-Marshall's requirements. Bethlehem's structural mills are located at Bethlehem, Steelton and Lackawanna, Pa.

Tin Plate Hookup Off

A year or two ago Bethlehem sought to acquire the McKeesport Tin Plate Co., McKeesport, Pa., and was also interested in taking over the Pittsburgh Steel Co. at the same time in order to provide steel for the former company, which has no open hearths. Differences over the purchase price, however, caused the deal to fall through.

McKeesport, with an annual capacity of 4,000,000 boxes, has made rapid strides in recent years, currently being a potent money maker, but there is no evidence that Bethlehem again is resuming negotiations for its acquisition and denial has been made that such a move is under way.

Pittsburgh Steel again is mentioned in present rumors, possibly because of its consideration at the time of the McKeesport negotiations. Pittsburgh Steel is an important producer of wire products and semi-finished material, with an annual ingot capacity of 720,000 tons. It has no shape mill, but its wire rod capacity of 300,000 tons is slightly larger than that of Bethlehem at Sparrows Point, Md. and Johnstown, Pa.

Few Independents Escape

Nor is the Jones & Laughlin Steel Corp. neglected in current gossip. One of the most attractive of the independent producers, this company has figured in numerous merger reports in the past and the usual denial has been forthcoming promptly in connection with recent rumors.

Inland Steel Co. also draws some consideration, principally because of its location, its sheet and structural capacity, and because it is believed Bethlehem is making a strong bid to assume a more prominent position in the structural field.

The acquisition of all of these companies still would leave Bethlehem below the Steel corporation in sheet production, so the name of the American Rolling Mill Co., leading independent sheet producer, is brought forward by the gossip passers to help fill the breach.

◆

All of these stories make interesting reading matter, particularly since little direct evidence is present to contradict the various conjectures. At the same time, even though it is confidently believed that Bethlehem has plans for further expansion, disposition is expected to be made of the Youngstown Sheet & Tube Co., merger before other sweeping moves are announced.

Announcement also still is lacking on the outcome of negotiations understood to have been under way between the Blaw-Knox Co. and the Truscon Steel Co. A merger of these two interests would serve to broaden further the already well diversified output of the former company. Benefits of this diversification, enhanced considerably last year through the acquisition of four companies engaged in the steel castings and mill equipment industry, are reflected in 1930 profits, which are expected to closely approximate those for 1929.

Unemployment naturally has hit the Pittsburgh district this year, but a farsighted policy on the part of steel plants has prevented a more serious situation than already exists.

At the expense of operating costs, leading producers have endeavored to maintain full forces even though schedules call for only two to three days' work a week. And because steel comprises such a large share of industrial activity in the district the effect upon Pittsburgh employment in general is more in the shape of reduced wages than loss of jobs. This is in contrast to the situation in automotive centers where complete shutdowns are resorted to from time to time.

Carries Along 97 Per Cent

Jones & Laughlin Steel Corp. reports it is employing about 97 per cent of the number on its payrolls a year ago. Most of these employes are working only part time but are deriving some weekly wage. New construction work by the corporation is helping to swell the total number employed, about 2000 being engaged in such pursuit.

Subsidiary companies of the United States Steel Corp. are following a similar plan. One unit recently was employing only 10 per cent fewer men than during peak schedules and every one of its various plants was in production even though operations were less than one-half of the best engagement.

Two plants scheduled for abandonment by the corporation this sum-

mer because of high costs were in the process of being dismantled when it was decided to continue their operations until the unemployment situation had cleared. Part-time schedules mean high costs and usually are avoided when possible, full or nearly full operations for one week followed by a complete shutdown the next being substituted instead.

Allegheny on 6-Hour Day

Allegheny Steel Co. has inaugurated a six-hour day on the sheet floors in order to relieve the unemployment situation, the change affecting 1800 men. Thomas Spacing Machine Co. recently announced the hiring of 100 machinists because of the booking of sufficient orders to insure steady operations over at least the next 60 days.

Steel mill equipment builders generally are maintaining steady operations with fair backlogs, and entertain optimism regarding a continuation of good business during 1931.

George T. Ladd, president of the United Engineering & Foundry Co., Pittsburgh, recently stated that between $50,000,000 and $75,000,000 will be expended in the near future by the larger steel companies on new equipment.

The latest report of the Employers' Association of Pittsburgh, that for October, reveals a trend in employment similar to that of most steel companies in that the number of hours worked has declined more than has the number employed. The 68 reporting firms showed that employment for that month was off only 13 per cent from the number employed a year ago, but there was a decline of 34 per cent in total man hours worked compared with October, 1929.

An industrial survey prepared by the bureau of business research of the University of Pittsburgh shows that September employment in Pittsburgh declined 11.9 per cent from a year ago, while employment in Philadelphia dropped 14.9 per cent, Cleveland 19 per cent, Cincinnati 23.3 per cent and Buffalo 25 per cent.

River Terminals Popular

The Pennsylvania railroad is following the lead of the Baltimore & Ohio and Pittsburgh & Lake Erie railroads in announcing plans for the construction of a rail-river terminal on the Ohio river and gives additional evidence of the steady development taking place in the use of river transportation. These three roads will spend more than $1,000,000 on facilities for the combined movement of bulk rail and barge freight.

The Pennsylvania terminal will be built to handle 1,000,000 tons of coal yearly from barges moved from the mines to cars for shipment to Youngstown and will be located at Conway, a short distance down the Ohio river from Pittsburgh. This dock and the one of the Pittsburgh & Lake Erie railroad will permit Pittsburgh coal operators to compete more effectively with southern producers in the Youngstown market, although at the same time the cheaper fuel for Youngstown interests will aid them in their competition with Pittsburgh consumers.

◆

This move of the Pennsylvania climaxes the efforts of Pittsburgh coal interests to obtain a lower freight rate to Youngstown. A short time ago the Montour railroad, subsidiary of Pittsburgh Coal Co., sought to build a line to Youngstown but the petition was denied by the interstate commerce commission, which stated that existing railroads should give the desired service.

These roads asked the commission for a rate of $1.02 from the Ohio river to Youngstown, which when combined with the barge rate would mean little saving compared with the all-rail rate of $1.42 from the Monongahela valley coal fields. The commission authorized a rate of 77 cents from Conway to Youngstown, a considerable saving for the latter city over the present charge for all-rail shipment.

Wheeling Plans Coke Chute

The Wheeling Steel Corp. has applied for a federal permit to construct a coke chute from the bridge crossing the Ohio river at Steubenville, O. This chute would facilitate the loading of coke and other material from railroad cars stationed on the bridge into barges directly below for distribution to various ports along the river.

Interest in the proposed canal from the Ohio river to Lake Erie, a project that has been championed by Pittsburgh with varying degrees of enthusiasm over the past 40 years, recently was heightened by the obtaining of support of the Mississippi Valley association, powerful proponent of inland waterways.

Youngstown industry is interested primarily in a navigable waterway from the Ohio steel city to the Ohio river, but that section would be of no benefit to Pittsburgh mills and the support of the Mississippi Valley group to the proposal to build through to Lake Erie is heralded with considerable satisfaction. A permanent organization is planned to promote action on the canal's construction.

It has been pointed out that immediate work on this as well as other inland waterway projects would provide employment for a large number of men and the association at its recent meeting recommended that congress provide an emergency appropriation in December to get work under way immediately.

Pittsburgh's industries would be rive no benefit from the waterway until its completion, years hence, even if the government's attitude is favorable. The Youngstown district, however, would participate in the advantages of a direct connection with the Ohio river in a comparatively short time.

Stores Gas in Old Wells

Carnegie Steel Co. is going western oil and gas producers one better in using old natural gas wells for the storage of artificial gas. Natural gas has been stored underground, but it is believed this is the first instance in which rock reservoirs have been employed to hold the artificial fuel.

This move was made to correct a waste of by-product gas that occurred from the Clairton gas ovens over the week-end when various steel plants are closed and unable to consume the fuel.

About 100 abandoned gas wells were taken over in the field developed in the McKeesport gas boom of 1919 and the excess by-product gas now is piped from the coke plant into these natural reservoirs where it is held without leakage until needed. It then is pumped out and distributed to the mills.

Cautious About New Year

The steel industry is proceeding with fewer optimistic statements than a year ago regarding its probable improvement in activity in early 1931. Executives in the Pittsburgh district anticipate some recovery in January from the December low in operations, but are content to await evidence of a definite correction in the recent lapse in steel demand before committing themselves.

Several products have had a not unfavorable year in 1930, all factors considered, and their future outlook may be considered somewhat better than that for the industry as a whole. These include tin plate, which takes first rank among what might be termed depression-proof products, structural steel, concrete bars and line pipe.

Affirm Unions' Standard

Washington—Division of trade standards, bureau of standards, has announced that the existing standard of standard weight malleable iron and steel screwed unions has been reaffirmed for another year without change.

EDITORIAL

Prosperity Will Return— No Need for Socialism

COL. ARTHUR WOODS is reported to have asked the Taylor society to outline a plan for the relief of unemployment and how to maintain employment at a normal level. The society devotes its attentions to problems of scientific management, is conservative and not inclined toward hasty or ill-advised conclusions. In line with this policy a special committee composed of industrial managers and management engineers submitted at its recent meeting a tentative draft of a code for industrial employment. The committee expressed the hope that after a year's consideration a document may be developed which will meet with that organization's approval.

The code evidently has nothing to do with the plan Colonel Woods suggested, yet in it is some intimation of what may be suggested. Have experiences in the past two years, a period of unusual contrast in employment, brought forth any new and sound ideas concerning industrial relations? If they have, a reading of the 4000-word code fails to reveal them; but study and experience have led the committee to emphasize the importance of certain views.

Employment Plans Identical with Those Proposed a Year Ago

According to this code "it is to the advantage of a proper balance between production and consumption that industry should not be too slow to reduce the daily and weekly hours as higher levels of output are permanently attained." It steps out boldly on the subject of employment security, saying "one of management's major objectives should be a definite guarantee of employment for a specified number of months in the year and provision of funds to make payments to workers for whom employment is not provided for the guaranteed period"—the employment insurance idea with which some industries are experimenting.

History repeats itself, and if Colonel Woods will refer to the recommendations made by President Harding's committee on unemployment of ten years ago he will find there practically all of the suggestions so far brought forth for the relief of present unemployment. One hundred or more business and industrial leaders deplored unemployment, then as now estimated as 3,500,000 to 5,000,000. The conference recommended part time work, rotation of jobs, manufacturing for stock, construction work wherever possible, and a shorter work week.

Between 1921 and 1931 there has been a decade remarkable for its generally high average of employment, high rates of wages, high wage earnings and unmatched material prosperity. These conditions did not follow as a consequence of the 1921 conference's recommendations, for industry soon recuperated; the nation's requirements, energies and enterprise quickly asserted themselves, and before the conference's final report was printed and given general circulation employment agencies were reporting a shortage of men.

Excessive Burden Thrown on Taxpayers Will Defeat Country's Prosperity Policy

Recommendations to curtail hours per day and days per week no longer applied. True, working hours have been gradually reduced, and the five-day week has been tried; but the point is that the nation became so busy, happy and prosperous that the existence of the President's conference was soon forgotten.

That is no reason for a let-down in efforts to relieve present unemployment, but it points a moral. This country is in no predicament warranting the expenditure of the millions of dollars proposed by some of the members of congress. It would, however, be in a predicament if such a burden were to be saddled on to the taxpayers for the next five or ten years. Work created by the state, further than that actually required and as part of the function of the state, is but a step removed from Socialism.

Looking back over the past decade; the marvelous display of industrial vitality in this country, the enterprise that is just beginning to bear fruit, there can be little doubt concerning the nation's upward, onward progress. The only peril is that we may be misled toward policies completely at variance with those on which the country's prosperity has been founded.

A number of senators who are urging extravagant expenditures for the relief of distress apparently are doing so with an eye to the effect on their constituency; they are in truth, as President Hoover phrased it "playing politics at the expense of human misery." They have disregarded the real consequence of such a policy, which points to higher income tax, a greater burden on those already shouldering the major share of it. This must ultimately work out to the disadvantage of the very people the misguided senators profess to befriend.

Slow Gradual Recovery Is Chief Feature in Outlook for 1931

BY COL. LEONARD P. AYRES
Vice President, Cleveland Trust Co.

THE most impressive fact about this business depression is that it is very much more severe than anyone expected it to be. It will rank as one of the important major depressions of our entire economic history. The reasons suggested to account for the international depression of 1930 are not alternative explanations. They are descriptions of three different sets of economic maladjustments, any one of which would have been adequate to bring about a depression, but which were in reality all simultaneously co-operative in bringing the period of prosperity to an end. One is the international race to increase production and capture markets. The second is the breaking down of the price control schemes, which seriously contributed to the collapse of commodity values. The third is the period of acute credit stringency.

One reason for the exceptional length of the depression in this country seems to be that the normal purchasing power of an important part of our population is still seriously restricted by the paying down of debts incurred in unsuccessful stock speculation. A second, and perhaps even more important reason for delay in the appearance of business recovery, is that we have not developed any new wave of constructive enterprise calling for the use of abundant supplies of credit that are now readily available at low rates of interest.

Construction Is Doubtful Factor In Early Business Gain

It does not now seem probable that the construction industry will furnish in 1931 the vigorous stimulus that is needed to get a general recovery of business under way. Not much expansion of manufacturing plants is to be looked for in the coming year. Public works and residential construction afford rather more hopeful prospects, and one hopeful symptom in connection with prospective construction is to be found in the fact that new financing for productive purposes has been going forward with exceptional vigor this year.

Three great industries have been of primary importance during the past decade in shaping the course of productive activity in American business. They are the construction industry, the automobile industry, and iron and steel. Unfortunately the prospects for expansion in iron and steel during 1931 do not now appear to be much better than those of the two other fundamentals.

The iron and steel industry has four customers of such predominating importance that they consume about two-thirds of its output. They are construction, railroads, automobiles, and pipe and equipment for moving and storing oil, water and gas. It now seems unlikely that construction and automobiles will demand largely increased tonnages in 1931. The railroads are adhering to a policy of rigid economy, and will almost surely consume less iron and steel next year than they have this year. Demands for pipe and equipment for natural gas lines have been of peak proportions in 1930, and will in all likelihood be less in 1931.

Spring of 1931 May Show First Signs of Next Phase

The history of business cycles for a great many years has been an irregular progression through the phases of prosperity, decline, depression, recovery, and back once more to prosperity. This is depression, we are far along in depression. The next development will be recovery, and the records of the depressions of the past half-century combine to support the hope and even the qualified opinion that the evidences of its beginnings will be apparent in the spring of 1931.

It now seems likely that business recovery will begin as a combination of many minor improvements, and that it will be accompanied by the developments that normally occur in such a period. These should include rising trends for short-term interest rates, bond prices, and stock prices, and advances before the end of the year in wholesale prices and industrial employment. Some increases over 1930 seem probable in building construction, iron and steel output and the production of automobiles.

The average levels for industrial wages, the cost of living, and the cost of building will probably be lower for 1931 than for 1930. Increases are probable in our export and import trade, the net profits of railroads and utilities, and, unfortunately, in the total numbers of business insolvencies. The year 1931 will probably be a year of slow business recovery, with activity not getting back to normal by the end of the year. There seems to be fair prospect, however, that it will be characterized by progressive improvements, instead of by recurrent declines.

Abstracted from an address presented before the Cleveland chamber of commerce, Dec. 9.

A Single Breaker May Recede « « « But The Tide Is Coming In!

Thus wrote the eminent English essayist, Macaulay, during the trying times of 1830.

«On what principle is it,» he asks, «that when we see nothing but improvement behind us, we are to expect nothing but deterioration before us?»

Although Macaulay wrote this stimulating analysis 100 years ago, it is interesting to note that he makes specific reference to 1930—«If we are to prophesy that in the year 1930.» But read what he says:

HISTORY is full of the signs of the natural progress of society. We see in almost every part of the annals of mankind how the industry of individuals, struggling up against wars, taxes, famines, conflagrations, mischievous prohibitions and more mischievous protections, creates faster than governments can squander, and repairs whatever invaders can destroy.

We see the wealth of nations increasing and all the arts of life approaching nearer and nearer to perfection in spite of the grossest corruption and the wildest profusion on the part of rulers.

The present moment is one of great distress. But how small will that distress appear when we think over the history of the last 40 years;—a war, compared with which, all other wars sink into insignificance;—taxation, such as the most heavily taxed people of former times could not have conceived;—a debt larger than all the public debts that ever existed in the world added together;—the food of the people studiously rendered dear;—the currency impudently debased, and imprudently restored.

Yet is the country poorer than in 1790? We firmly believe that, in spite of all the misgovernment of her rulers she has been almost constantly becoming richer and richer. Now and then there has been a stoppage, now and then a short retrogression; but as to the general tendency there can be no doubt. A single breaker may recede; but the tide is evidently coming in.

If we were to prophesy that in the year 1930, a population of fifty millions, better fed, clad, and lodged than the English of our time, will cover these islands—that Sussex or Huntingdonshire will be wealthier than the wealthiest part of the West-Riding of Yorkshire now are—that cultivation, rich as that of a flower-garden, will be carried up to the very tops of Ben Nevis and Helvellyn—that machines constructed on principles yet undiscovered will be in every house—that there will be no highways but railroads, no travelling but by steam—that our debt, vast as it seems to us, will appear to our great-grandchildren a trifling encumbrance, which might easily be paid off in a year or two—many people would think us insane.

We prophesy nothing; but this we say—if any person had told the Parliament which met in perplexity and terror after the crash of 1720 that in 1830 the wealth of England would surpass all their wildest dreams, that the annual revenue would equal the principal of that debt which they considered an intolerable burden—that for one man of £10,000 then living, there would be five men of £50,000; that London would be twice as large and twice as populous and that nevertheless the rate of mortality would have diminished to one-half what it then was—that the post-office would bring more into the exchequer than the excise and customs had brought in together under Charles II—that stage-coaches would run from London to York in twenty-four hours—that men would sail without wind, and would be beginning to ride without horses—our ancestors would have given as much credit to the prediction as they gave to Gulliver's Travels.

Yet the prediction would have been true; and

From Lord Thomas Babington Macaulay's *Essay on Southey's Colloquies on Society*, published in Edinburgh Review January, 1830.

they would have perceived that it was not altogether absurd, if they had considered that the country was then raising every year a sum which would have purchased the fee-simple of the revenue of the Plantagenets—ten times what supported the government of Elizabeth—three times what, in the time of Oliver Cromwell, had been thought intolerably oppressive. To almost all men the state of things in which they have been used to live seems to be the necessary state of things.

We have heard it said, that five per cent is the natural interest of money, that 12 is the natural number of a jury, that 40 shillings is the natural qualification of a county voter. Hence it is, that though, in every age everybody knows that up to his own time progressive improvement has been taking place, nobody seems to reckon on any improvement during the next generation.

We cannot absolutely prove that those are in error who tell us that society has reached the turning point—that we have seen our best days. But so said all who came before us, and with just as much apparent reason.

"A million a-year will beggar us," said the patriots of 1640.

"Two millions a-year will grind the country to powder," was the cry in 1660.

"Six millions a-year and a debt of fifty millions!" exclaimed Swift—"the high allies have been the ruin of us."

"A hundred and forty millions of debt" said Junius—"well may we say that we owe Lord Chatham more than we shall ever pay, if we owe him such a debt as this."

"Two hundred and forty millions of debt!" cried all the statesmen of 1783 in chorus—"what abilities, or what economy on the part of a minister, can save a country so burdened?" We know that if, since 1783, no fresh debt had been incurred, the increased resources of the country would have enabled us to defray that burden, at which Pitt, Fox and Burke stood aghast—nay, to defray it over and over again, and that with much lighter taxation than what we have actually borne. On what principle is it, that when we see nothing but improvement behind us, we are to expect nothing but deterioration before us?

It is not by the intermeddling of Mr. Southey's idol—the omniscient and omnipotent State—but by the prudence and energy of the people, that England has hitherto been carried forward in civilization; and it is to the same prudence and the same energy that we now look with comfort and good hope.

Our rulers will best promote the improvement of the nation by strictly confining themselves to their own legitimate duties—by leaving capital to find its most lucrative course, commodities their fair price, industry and intelligence their natural reward, idleness and folly their natural punishment—by maintaining peace, by defending property, by diminishing the price of law, and by observing strict economy in every department of the State.

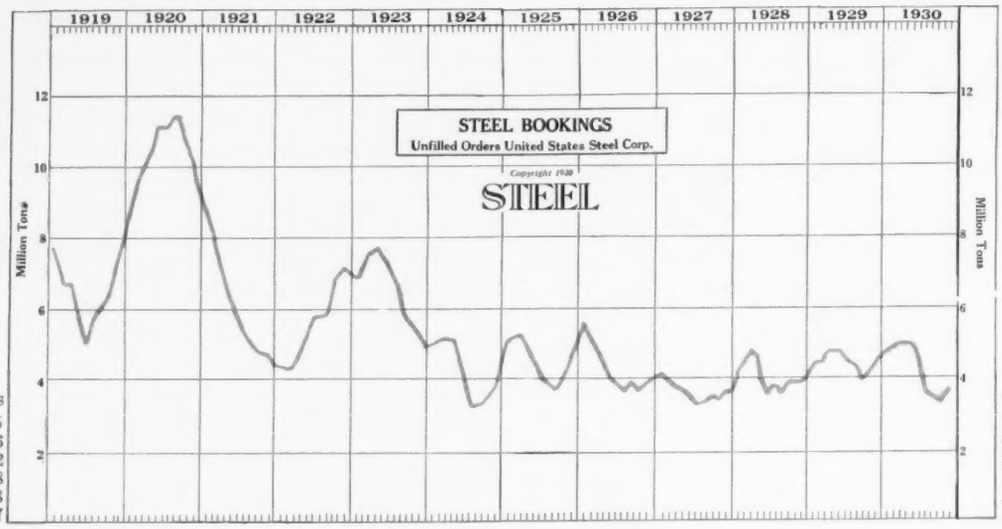
Let the Government do this—the People will assuredly do the rest.

That Macaulay underestimated the progress that has since been made only serves to emphasize the soundness of his premise—"a single breaker may recede, but the tide is coming in."

THE foregoing timely and appropriate reference to Macaulay's analysis of 1830 is being issued by the Universal Atlas Cement Co., 208 South La Salle street, Chicago, under the signature of B. F. Affleck, president. It is reproduced here by special permission.

—THE EDITORS

THE BUSINESS TREND



1929 Thousand Tons	
Nov.	4,125
Oct.	4,086
Sept.	3,902
Aug.	3,658
July	4,088
June	4,257

1930 Thousand Tons	
Nov.	3,639
Oct.	3,481
Sept.	3,424
Aug.	3,580
July	4,022
June	3,968

Experts Are Conservative in Forecasts for 1931

THIS is the time of the year when the experts take stock of business conditions and comment on the outlook for the approaching 12-month period. Many predictions have been published during the past few days, and in the majority of cases the forecasts have been couched in severely conservative language.

Certainly the present situation is such to invoke unusual caution on the part of anyone who undertakes to say what is in store in 1931. However, after perusing a dozen or more forecasts, we got the impression that some of the authors have permitted caution to distort their real published opinions. An expert unfortunate enough to have spoken too optimistically last September now is likely to be more conservative than if he had been right at that time. The majority of economic prognosticators expected an upturn sometime in the latter part of 1930. Many of them now feel that the depression is more severe than they had expected. The result is that today they are tempted to understate rather than overstate the outlook.

December Witnesses Little Change From November Status

It now appears that December promises no marked changes from the conditions which held throughout November. Production schedules have not changed to any important degree. Steelmaking operations are below 40 per cent of capacity. Automobile production for the moment is slightly better, but curtailments announced for the holidays will offset the present increases.

The report of the United States Steel Corp. placing unfilled orders on Nov. 30 at 3,639,636 tons is interesting in that the increase of 158,000 tons or 4.5 per cent over the Oct. 31 total is the largest for any November since 1925. However the backlog is 11 per cent under that of a year ago and nearly 1 per cent below the total on Nov. 30, 1928.

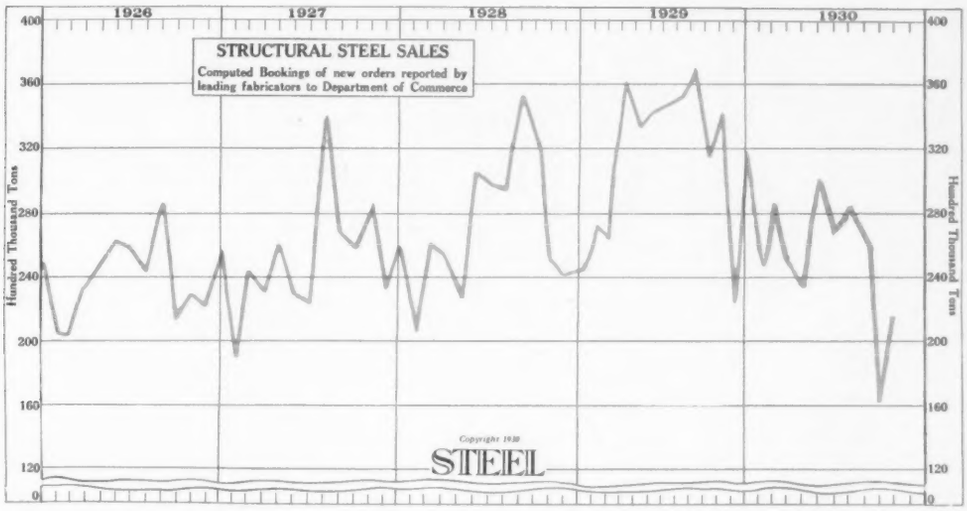
Freight Volume Dips Sharply, But Not as Abruptly as in 1929

Hope that freight volume might hold up at better than the seasonal rate seems to have been in vain. The resistance to decline in October, which was encouraging at the time, has been followed by a rapid drop. Car loadings in the week ending Nov. 29 totaled only 702,085 cars. The decline in November this year was not as precipitous as it was in 1929, but loadings to date were 13 per cent lower than during the corresponding period last year.

Fractional increases and decreases in commodity prices indices continue to be the rule, and therefore no trend is yet discernible. It now is evident that in comparison with the price decline of 1921, the present downward swing is making up in duration what it lacked in declivity. The 1921 drop was more abrupt, but the present one has dragged along over a longer period.

STEEL's composite of steel and iron prices has remained at $31.84 for two weeks, but appears to be threatened with a slight drop Dec. 17 due to reductions in quotations in semifinished material.

Tons	1930	1929
October	215,600	319,500
September	162,000	296,450
August	264,000	361,900
July	284,000	350,350
June	276,000	342,650
May	296,000	342,650
Apr.	236,000	334,950

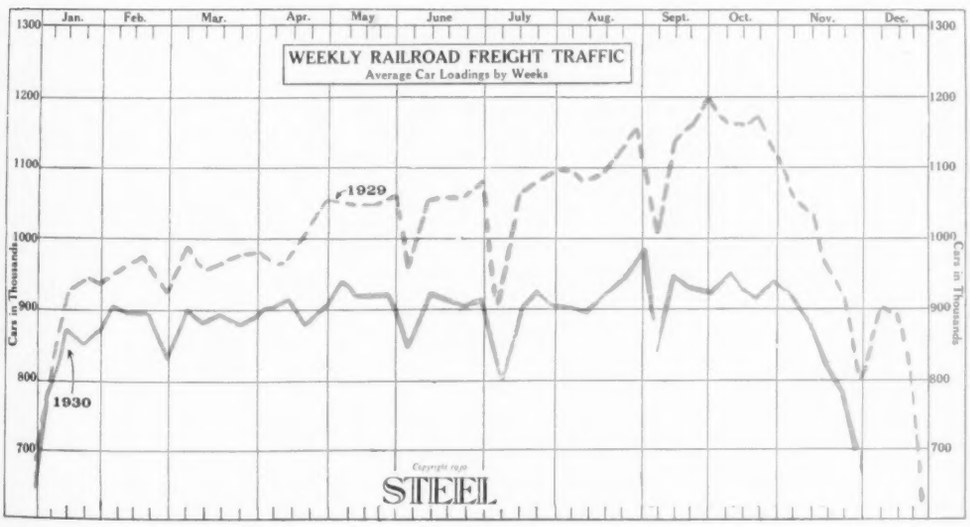


Fabricated Structural Steel Orders Recover During October

October bookings of structural steel made a sharp recovery from the unusually low level which was reached in September. Orders during the month for 215,600 tons represented 53.9 per cent of capacity as compared with 162,000 tons and 40.5 per cent of capacity in the preceding period. The gain, however, was not enough to entirely make up for the loss sustained during September, as August orders had stood at 264,000 tons and 66 per cent of capacity. October, 1929, was one of the best months of that year, with a tonnage of 319,550. Total orders for ten months of 1930 are for 2,485,000 tons, compared with 3,088,085 tons booked in ten months of 1929.

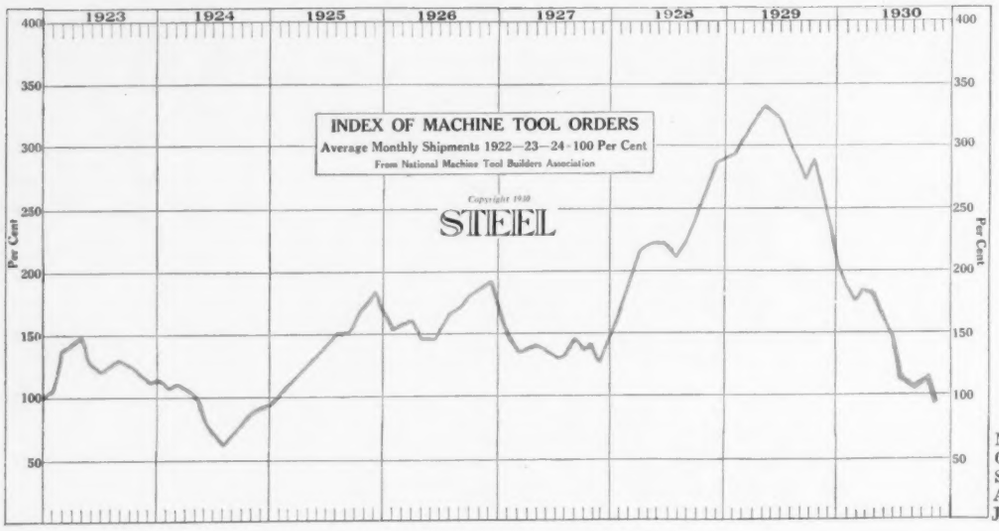
Freight Car Movement Meets With Heavy Seasonal Reductions

Car loadings of revenue freight during the week ended Nov. 29 suffered as usual from suspension of activity for the Thanksgiving holiday, and dropped to 702,085 cars. For the week ended Nov. 22 the total was 779,757 cars and for the week preceding that, 829,251 cars. As was the case last year, each week of November was marked by heavy losses, but the rate of decrease is slightly under that of last year. For the week last reported, the decline was 77,672 cars. For comparable weeks in 1929 and 1928, losses were 134,225 and 198,471 cars. However, in the week ended Nov. 29, 1929, there were 836,310 cars loaded. In terms of monthly volume, October was the best month of 1930.



1930	
Nov. 29	702,085
Nov. 22	779,757
Nov. 15	829,251
Nov. 8	881,401
Nov. 1	934,640
Oct. 25	959,335

1929	
Nov. 29	836,310
Nov. 22	949,716
Nov. 15	982,926
Nov. 8	1,048,968
Nov. 1	1,072,234
Oct. 25	1,134,359



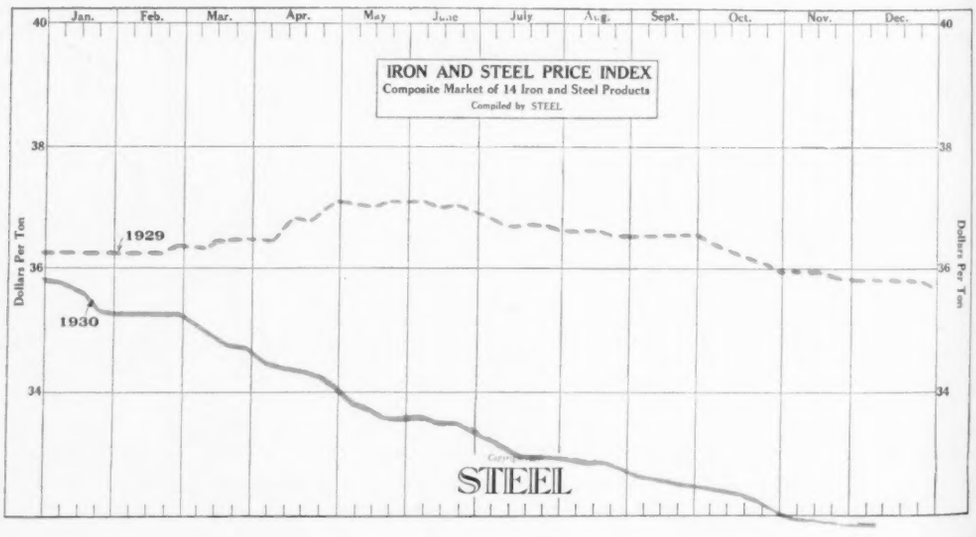
	1930	1929
November	95.5	247.2
October	113.3	287.0
September	113.6	265.8
August	110.2	286.1
July	117.3	294.8

Machine Tool Orders Break to Lowest Point in Six Years

The three months' moving average of machine tool orders compiled by the National Machine Tool Builders association last month reached the lowest point since late in 1924 and stands, as of November 30, at 95.5. The decline is brought about by the effect which the single month of November had upon the moving figure, the month being even lower than one of the single periods which made the three months' average reach bottom in August, 1924, at 69.4. The current month would have to fall below 60 in order to bring the three months' moving average down to the level prevailing at that time. November shipments, the lowest recorded in five years, kept unfilled orders close to the status of last month.

Composite of Iron and Steel Prices Holds in Face of Further Readjustments

STEEL's composite of iron and steel prices, which recently has been moving gradually lower during two-week periods rather than week by week, is placed at $31.84 for Dec. 10, which is the same level as that of Dec. 3. On Nov. 5 and 12 it was $31.98 and on Nov. 19 and 26 it was $31.86. The apparent resistance toward steady downward revision and the fact that the last drop was slight cannot, however, be taken as a guarantee that the bottom has been reached as yet. In fact, indications during the market week ending Dec. 17 indicate that the composite will drop slightly again. A realignment of semifinished prices, which hitherto had escaped adjustment, will tend to lower the composite figure.

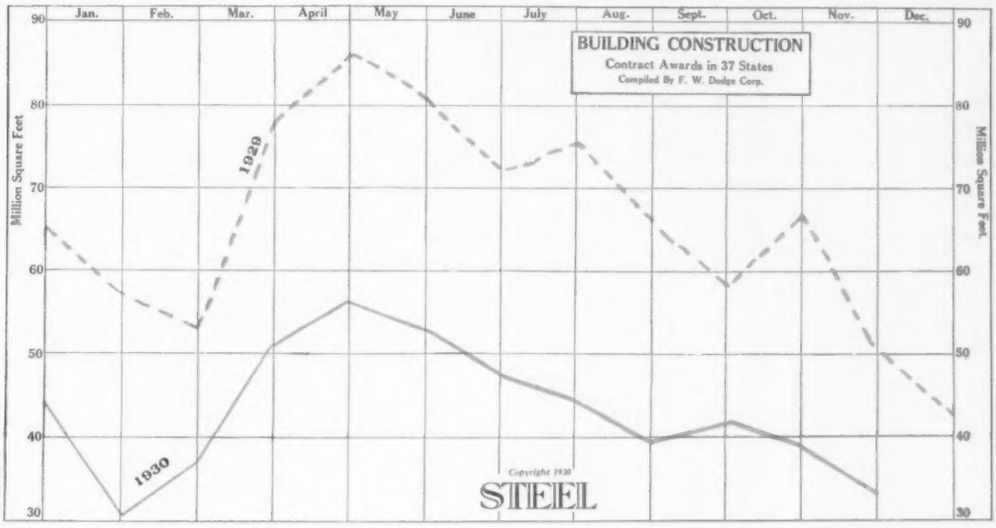


Weekly Figures

Dec. 10	$31.84
Dec. 3	31.84
Nov. 26	31.86
Nov. 19	31.86
Nov. 12	31.98
Nov. 5	31.98

Monthly Averages

November	$31.92
October	32.26
September	32.65


BUILDING CONSTRUCTION
Contract Awards in 37 States
Compiled By F. W. Dodge Corp.
Million Square Feet
1929
1930
Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec.
90 80 70 60 50 40 30
Copyright 1930
STEEL

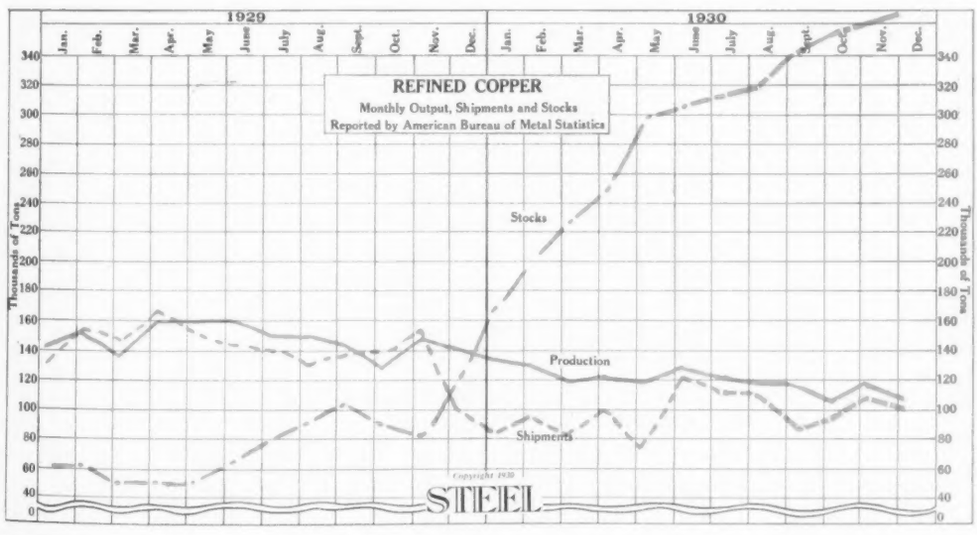
Square Feet	
November, 1930	33,098,600
October, 1930	39,483,700
November, 1929	51,052,400

Construction Awards Taper Off Sharply, Due Largely to Seasonal Trend

Building construction in November followed the seasonal trend wth a distinct recession, and handicapped by an already low position, came to the lowest point since January. Construction awards in 37 states, reported by the F. W. Dodge Corp., totaled 33,098,600 square feet, as compared with 39,483,700 square feet in October and 51,052,400 square feet in November of last year. During the past 11 months comfortable gains were made only in February, March and in April, when activity was at its highest for the year. A slight increase was made in September. The November drop was marked by a loss in residential construction, which recently has helped support the total.

Shipments and Production of Refined Copper Marked by Cuts in November

Although shipments of refined copper declined in November, production was cut also, with the result that only a slight gain in stocks took place. The October gain in stocks, which was the lowest registered this year, was exceeded by only a few hundred tons. In October production of 118,229 tons and shipment of 113,949 tons left a net accumulation of 4280 tons. In November production of 112,646 tons and shipment of 107,744 tons left a net gain of 4902 tons. Even this moderate gain brought stocks to 369,832 tons, the largest amount since April, 1921. In November, 1929, there were 145,376 tons produced, 106,858 tons shipped and stocks on hand were 126,919 tons.


1929
1930
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
REFINED COPPER
Monthly Output, Shipments and Stocks
Reported by American Bureau of Metal Statistics
Thousands of Tons
Stocks
Production
Shipments
340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 0
Copyright 1930
STEEL

Stocks

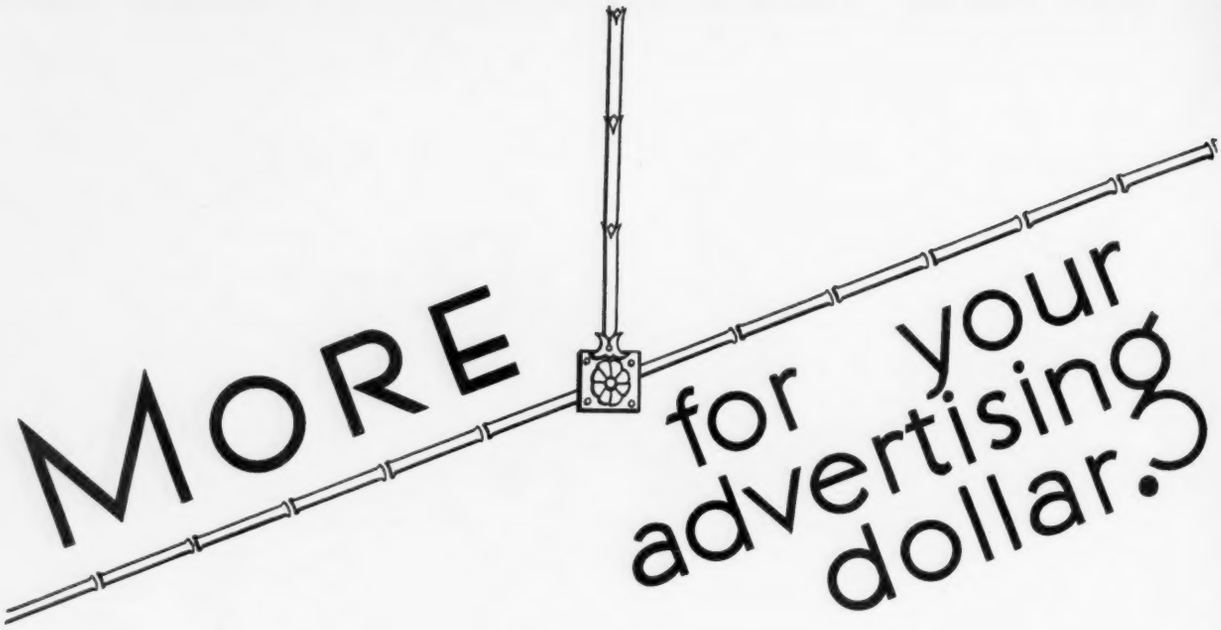
November, 1930	369,832
October, 1930	364,930
November, 1929	126,919

Production

November, 1930	112,646
October, 1930	118,229
November, 1929	145,376

Shipments

November, 1930	107,744
October, 1930	113,949
November, 1929	106,858



This will be uppermost in mind when 1931 advertising appropriations are made up. STEEL *gives* these extra values in two ways.

Increased Reader Interest

STEEL gives a briefed, interpretive presentation of editorial material. The main points are covered in a digest. Special features are displayed according to reader interest. One reader writes, "Your readers will surely respond to the broader scope that you are to cover under the appropriate title STEEL, and your advertisers must surely sense both the mechanical and advertising advantages of your aggressive policy."

Greater Visibility of Advertising

Advertising and editorial are intermingled, — the reader is directed toward your advertisement. You can be certain that, during 1931, your messages in STEEL will not be buried in with hundreds of others. A reader writes "STEEL impresses me as having a new virility and being sure of the job it wants to do. The new arrangement of the advertising pages also gives a more distinguished tone to the paper."

These represent "extra values" for your advertising dollar.

Old enough to know the great traditions of steel . . . young enough to lead the industry in a modern age.

STEEL

A PENTON PUBLICATION
CLEVELAND

For forty-eight years—IRON TRADE REVIEW

Published Every Thursday

BRANCH OFFICES: NEW YORK · PITTSBURGH · CHICAGO · SAN FRANCISCO · LONDON

Other Penton Publications:

Daily Metal Trade · The Foundry · Machine Design · Abrasive Industry · Automotive Abstracts · Marine Review · Power Boating

Special lubricant is applied to the steel tube before it is drawn through the die

Forty Years of Seamless Steel Tubes

Ellwood Ivins Plant a Tribute to Inventive Genius of Founder

BY H. R. SIMONDS
Associate Editor, STEEL

SEAMLESS steel tubes, first introduced some 40 years ago, enter into the construction of an almost limitless variety of products in everyday use. It was only a few years ago that the bicycle industry absorbed a large tonnage of seamless steel tubing, but this demand has since diminished and given way to others. The first seamless steel tube in this country was a product of the inventive genius of Ellwood Ivins who, realizing the value of his creation, constructed a plant for its manufacture. The Ellwood Ivins' Steel Tube Works, Oak Lane, Pa., today manufactures the tubing at a rate of 250,000 feet a week, in sharp contrast to the original capacity of 5000 feet a month.

The product varies from 5 inches down to 0.015-inch in diameter, although the great bulk of the output is confined to carbon steel tubes varying in diameters from 1/64-inch to 2 inches. Equipment will permit drawing tubes down to 0.008-inch, or finer than a horsehair; however, as yet no use has been found for these hairlike tubes.

Due to the variation in sizes no standardized process of manufacture is practiced but the general procedure illustrates the methods employed. Raw material in the form of hollow billets is received in carload lots on a siding which enters the plant. The billets are unloaded by traveling cranes and are placed near one of several pointing machines for the first operation. They are heated at one end in small oil-fired furnaces and then swaged in one of several different ways, one being by means of a knuckle joint pointer which is equipped to point five or six different sizes of billets. After pointing and while the end of the billet is still hot the operator punches a hole through one wall of the tube 4 or 5 inches from the end. This is for the purpose of opening up circulation of air for subsequent operations and is regarded as an important item in the process.

After pointing the billets proceed either to the first drawing operation or to the annealing furnace, depending upon the material used and the nature of the draw. In the drawing operation the billet is placed over a mandrel before its point is inserted through the draw-

TUBE expander which, through pressure exerted by three sets of rollers, loosens the drawn tube from the mandrel, an operation required by chrome-nickel tubing especially

ing dies. The point is caught in the jaws of a traveler block or clamp. This block is pulled by a heavy chain which in turn is driven by a large electric motor. The largest machine uses a 500-horsepower motor.

The mandrel is fastened firmly to the foot of the machine so that its free end remains continually at the point of the drawing dies. In this way the dies determine the outside diameter of the tube and the mandrel controls the inside diameter. One of the important problems in the art of tube drawing is to get the relative sizes of dies, mandrel and tube correct. If the mandrel is too large the tube which is being drawn will break and if the mandrel is too small the tube size will be incorrect. For the extremely small sizes the mandrel is omitted but in these cases the operation is designed to give correct results without a mandrel. It has been found that however small a tube may be drawn without the use of a mandrel the hole will remain.

Frequent Annealing Required

Drawing operations are repeated until the tube is brought to the desired size. A heavy specially prepared drawing lubricant is used just ahead of the dies, as shown in an accompanying illustration. Frequent annealing between draws is necessary and with many materials an anneal follows each draw. After each anneal the tubes are pickled and washed before returning to a subsequent drawing operation.

The pickling department is well equipped with handling apparatus and has a somewhat unusual feature of a complete piping system for acids and other solutions so that the control of all solutions and tanks is from one central point. Some idea of the efficiency of this department may be gained from the fact that the complete pickling for the entire output of the plant is handled by four men.

Annealing is done by electric and coal-fired furnaces. Each furnace handles approximately 1 ton of tubing per hour in lengths up to 24 feet. For most steel used the annealing temperature is held at 1400 degrees Fahr. and the time ranges from 10 to 30 minutes. Some annealing and most of the heat treating is done in the electric furnace shown in accompanying illustrations. This is a 28-foot furnace with electrically controlled doors at both ends.

Steel tables long enough to take the full charge of the furnace extend out from each door. The method of loading and unloading the furnace is as follows: Two long sheets of chrome-nickel steel, each 28 feet in length are fastened together with a short piece of chrome-nickel steel cable. A similar cable is fastened to the outer end of one of the charging sheets and passes over a pulley at the end of the discharge table, then under the furnace to a driving drum and back to the end of the other charging sheet.

Operation Is Continuous

In this way the two sheets may be moved forward and back so that one is always in the furnace while the other rests on one of the two tables. The charge is made up on the sheet resting on the table and when the furnace is to be loaded both doors are opened and the two sheets are moved so that the new charge enters the furnace and the other sheet moves out of the furnace on to the opposite table. By this means the time of charging is cut to a minimum and the furnace is in continuous operation. The bed and other metal parts in the furnace are made of chrome-nickel steel. Temperature control within the furnace is automatic by means of pyrometers located at several different points.

After drawing, the tubes are put through a special rotary straightener, designed by Mr. Ivins, and are then sawed to length, oiled for protection

About Ellwood Ivins . . . .

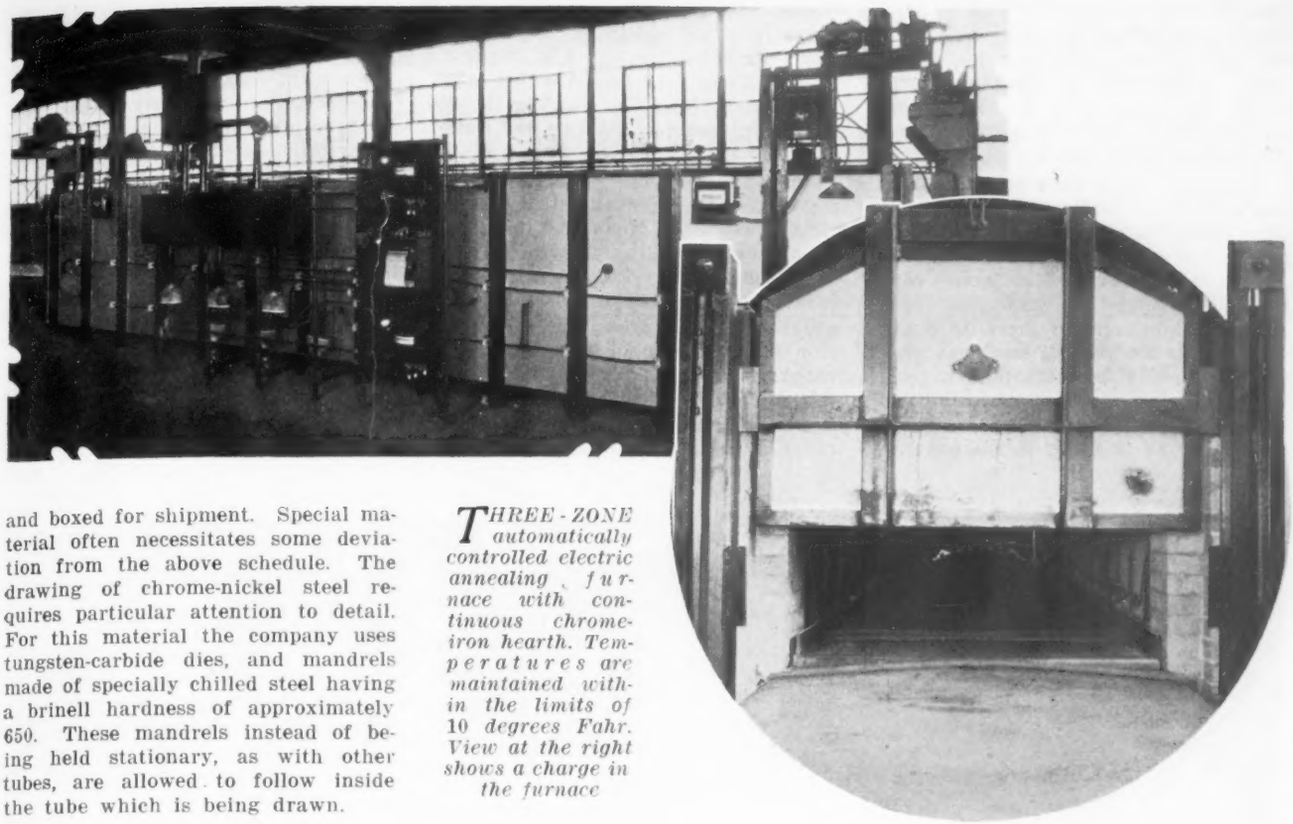
LIKE the proverbial Horatio Alger tales, reads the biography of Ellwood Ivins, manufacturer of the first seamless steel tube in this country. Born in Philadelphia about 60 years ago, educated to be an artist but possessed with a penchant for things mechanical, Mr. Ivins, an orphan at 15, developed his seamless tube by first experimenting successfully with solid 14 karat gold. He worked in a small, dingy upstairs room, with no machinery save a drawbench, a hammer or two and his wits, and with an initial capital investment of about $15.

Ellwood Ivins

The gold seamless tubes were small in size and for use in watch cases. Later, at the request of Cyrus W. Chambers, then head of Chambers Bros. & Co., brick machinery builders, Mr. Ivins made his first attempt at seamless steel tubing. The first piece was 10 feet in length, ½-inch in diameter and with a wall thickness of 1/32-inch. For this work Mr. Ivins received $500, the highest price ever paid for a piece of seamless steel tubing of these dimensions.

Spurred on by bulldog tenacity of purpose and constantly striving for quality and accuracy of product, Ellwood Ivins saw his modest beginnings transformed in less than half a century into a large and thriving industry. He retained full control until the recent incorporation and then relinquished only 5 per cent of the stock.

In recognition of his achievements, Mr. Ivins has been the recipient of numerous medals and awards including the gold medal from Massachusetts Mechanic association, Boston; a medal from the Columbian exposition, Chicago; and several others.



THREE-ZONE automatically controlled electric annealing furnace with continuous chrome-iron hearth. Temperatures are maintained within the limits of 10 degrees Fahr. View at the right shows a charge in the furnace

and boxed for shipment. Special material often necessitates some deviation from the above schedule. The drawing of chrome-nickel steel requires particular attention to detail. For this material the company uses tungsten-carbide dies, and mandrels made of specially chilled steel having a brinell hardness of approximately 650. These mandrels instead of being held stationary, as with other tubes, are allowed to follow inside the tube which is being drawn.

Tube Expander Developed

After drawing by this method, the tube and mandrel are in firm contact so that it is impossible to remove the mandrel without a further operation which is known as tube expanding. The machine which performs this operation, known as a tube expander, is shown in one of the illustrations. It is a machine specially designed and built in the plant and consists of three sets of rollers which, as the tube and mandrel are fed through, exert certain pressure at eight different points around the circumference of the tube. The result is a slight expansion of the tube, not over 0.002-inch, permitting the mandrel to be withdrawn. This particular method of drawing tubes was developed by Mr. Ivins after considerable difficulty and is the result of experience in the manufacture of tubing for special purposes such as golf club shanks.

Special adaptations of the seamless tube drawing process have been worked out, one of which is a method of forming a reinforced tube wherein the wall thickness is 14-gage for a short distance at one end and 21-gage throughout the remainder of the length. A similar tube has been produced, reinforced at both ends by the 14-gage thickness. These tubes are not "upset" but actually drawn to 0.002-inch limits both in the thick and thin sections. How the mandrel is removed when both ends are smaller than the center of the tube is one of the problems solved in connection with this design.

For most of the work in the plant, an alloy die is used, high in carbon and containing chromium and tungsten. The dies for all small sizes of tube are standard in outside dimensions, being 4 by 4 by 1 inches. Unusual care is taken in the heat treatment of these dies since accurate temperature control greatly increases die life. The dies are heated in a small electric furnace to 1600 degres Fahr. and are then quenched in brine which is automatically maintained by refrigerating machines at 45 degrees Fahr. Heating of the dies is rapid and requires but 10 minutes for each group of dies treated. The dies are drilled before heat treatment and afterwards are accurately ground to size. This is done with a small emery wheel on a machine equipped with special holding jigs.

Dies Are Reground

Dies have an average life of 16,000 feet of tubing at which time the wear is approximately 0.002-inch. At this time the dies are sent back to the heat treating department where they are again put through the furnace and quench. This shrinks them down by 0.005-inch or more and makes it possible to regrind them to size. The shrinking and regrinding may be repeated about 10 times for each size of hole after which the dies are ground to the next larger size.

All dies and mandrels are chromium plated. This is a special process developed at the plant. The deposit of chromium is approximately 0.0002-inch. For the dies this plating costs about 7 cents each but it has been found by tests that the life of each die when plated is more than three times the life of the same die unplated.

Lubricant is Important

The importance of a good lubricant in drawing steel tubes cannot be underestimated. A subsidiary of the Ellwood Ivins Steel Tube Works, known as the Research Mfg Co., Philadelphia, has developed a special lubricant which is now used for all drawing at the Ivins plant. The important properties of a drawing lubricant are toughness and viscosity. Great care is taken to keep the lubricant free from abrasive particles. The dies are cleaned frequently and the old lubricant replaced with new, after reconditioning a certain percentage of the old lubricant to be mixed with the new.

The plant maintains its own laboratory where tests are made of all incoming material. The lubricant, even though it comes from a subsidiary plant, is subjected to rigid tests and is rejected when it fails to meet specifications. The company feels that this practice alone has done much to maintain and increase the quality of the output.

Until May, 1929, the affairs of the company were entirely in the hands of Ellwood Ivins who, to protect the future of the organization, incorporated at that time, retaining 95 per cent of the stock. Mr. Ivins, although the originator of a new process, is primarily a manufacturer and his suc-

cess may be measured in part by the loyalty and generally happy spirit of the 300 odd workers under his direction. Thirty men in the plant have been associated with Mr. Ivins for over 30 years, two of this group having records of 37 years.

In answer to a question regarding his methods of dealing with employes, Mr. Ivins made the following comment:

"We make them feel at home—feel that the company has more than just a financial interest in them. In addition to this we give all employes who have been with us more than a year a share in the profits. This share amounts to from 10 to 40 per cent of the wage and is added in the pay envelope each week. The amount is based on an estimate of the profits of the week. Each month the actual profits are figured and an adjustment is made. Sometimes the company owes the men and sometimes the men owe the company; but no difficulties arise, the employes all understand the system and apparently have implicit faith in the fairness of the management. This plan has been in operation for more than 20 years."

Technical Papers Added to Metal Congress Program

Organizations that will participate in the Western National Metal Congress at Civic auditorium, San Francisco, Feb. 16-20, are drawing their plans to a close and completing their program of technical papers. The Pacific Coast Gas association recently has added to its part of the congress technical talks on "Gas Furnaces for Nitriding," by J. H. Knapp, J. H. Knapp Co., Los Angeles, and "Carburizing Steel by Gas," by R. G. Guthrie, Peoples Light, Gas and Coke Co., Chicago.

Latest discoveries pertaining to nitriding will be outlined by O. E. Harder, Battelle Memorial institute, Columbus, O., on the program of the American Society of Mechanical Engineers. Other recent additions to the program of this group are a discussion of the creep of metals at elevated temperatures by P. G. McVetty, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and "Machinability of Metals," by A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn.

Virtually all of the five days of sessions, many of which are to be held in the St. Francis hotel, will refer directly to the steel industry, although nearly every metal used in industry will be given attention.

Exhibit Honors Career of Elmer A. Sperry

A special exhibit memorializing the life and scientific achievements of Elmer A. Sperry, noted inventor, has been opened by the Museum of the Peaceful Arts, 220 East Forty-second street, New York, and will be open each week day until Jan. 1. Mr. Sperry, inventor of the gyro-compass and more than 350 other significant inventions in virtually every major field of science and industry, was past president of the American Society of Mechanical Engineers and of the Museum of the Peaceful Arts. Among the many inventions and records of honors that will be displayed will be arc lights like those that formerly lighted small towns, aircraft searchlights, devices for gunfire control and aircraft control, the gyro-compass, and the ship stabilizer.

New Gray Iron Department To Aid Castings User

The Gray Iron institute, Cleveland, has formed a new technical department which will have as its most important function service to casting users. Among the projects to be undertaken by the department, as reported in a recent bulletin of the institute, are the following: The elevation of the standards of gray cast iron; the study and issuance of advice on specifications; a survey of the test bar position in the light of modern engineering advance and needs; the testing of bars that have been submitted by members of the institute; and the establishment of specifications.

Ends of hollow billets are heated in the furnace (left) and pointed in the special machine (right) before being drawn

Latest developments and steps to be followed in the concentration of chromite are presented in research paper 3049 of the bureau of mines, Washington, by H. A. Doerner. The paper "Concentration of Chromite," gives a brief history of the industry and an analysis of principal domestic deposits.

Why Timken Bearing Equipped Spindles Have Revolutionized Machine Tool Performance

COMPLETELY upsetting all previous standards of spindle operation, Timken Bearing Equipped spindles have created new standards of accuracy, speed and economy based on *permanent spindle rigidity*.

Timken pioneered this great forward step and developed it in cooperation with leading machine tool builders. Timken dominance throughout the machine tool industry is thus due equally to the keen, far-sighted engineering judgment of the machine tool builders themselves, and to the exclusive features of the Timken Tapered Roller Bearing.

No other type of bearing can duplicate Timken anti-friction performance on the spindle, because no other bearing possesses the necessary inherent characteristics of design and load capacity.

It isn't merely a question of securing *initial* spindle rigidity; that can be done with plain bearings.

It's a matter of maintaining maximum spindle stability month after month and year after year in the face of the severest radial, thrust or combined loads—without having to replace bearings or change spindles.

It's a case of being able to take deeper and deeper cuts . . . of higher and higher speeds—without a sign of chatter . . . of being able to utilize the new tool alloys to the limit of their capacity.

It means that precision adjustment must be provided to compensate for wear because, as every designing engineer knows, wear is inevitable where parts revolve in contact and under severe loads.

Such wear may be very slow and very small, as in Timken Bearings, but it only takes a few ten-thousandths to throw a spindle seriously out of alignment, hence, if there is no provision for accurate take-up, the bearing must be replaced.

No machine tool user need now be handicapped with obsolescent equipment, as most machine tool builders standardize on Timken Bearings for spindles, gear boxes and feed mechanisms. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN

Tapered

ROLLER BEARINGS

Good Selectivity Is Required for Magnetic Analysis

BY DR. SIGFRID SPECHT

Chief Engineer, Ferrous Magnetic Corp.

NUMEROUS investigators and scientists have succeeded in definitely correlating various physio-electrical results with the magnetic character of ferrous metals during the many years of magnetic research. In this age of alloys, however, a direct explanation by existing theories is not always possible for some phenomena which may arise; and explaining and reconciling previously observed facts to the new phenomena necessitates the working out of some new theory by natural philosophy. The accompanying article presents an advanced insight into the science of magnetic testing, being from the pen of Dr. Sigfrid Specht, chief engineer, Ferrous Magnetic Corp., New York.

ONE of the difficulties encountered in properly interpreting the manifestations of magnetic phenomena observed in connection with known magnetic testing methods has been the intermingling of indications resulting from variations in respect to different properties or characteristics of the specimen under test, and also the intermingling of indications which are functions of the testing apparatus with those which are related to the material being tested. In other words, previously known devices and methods have lacked selectivity in respect to the identification or separation of properties and phenomena or characteristics of the test specimen.

Unbalanced Condition Present

Some of the errors encountered in magnetic testing result from the failure to appreciate and therefore to compensate for a certain unsymmetrical or unbalanced condition in the magnetic field of a usual primary testing coil or solenoid. The construction of coils has been more or less emperical in regard to design, calculation, and results up to the present. The author believes the unbalanced condition of the magnetic field to be associated with the reluctance drop in the solenoid and current phenomena of uncyclic repetition in opposed relation to the magetizing force.

An energized coil produces a magnetic field having a stream or direction characteristic, depending upon the direction of the windings, and the flux density within the core, under given conditions of impressed electromotive force, increases from each end towards the longitudinal center. The locus of points of maximum flux density in the field of a cylindrical solenoid is a circle concentric with the longitudinal axis of the coil and it has been assumed that in a uniformly wound coil this circle lies in a transverse plane passing through the longitudinal center of the coil axis. Due in part to the reluctance and current phenomena effect previously referred to, however, the locus is upstream from the longitudinal center and the rate of flux density increase from the upstream end to the locus differs from the rate of flux density increase from the downstream end to the locus. Accordingly, if the flux density variations are plotted on the longitudinal axis of the coil, the resulting curve is asymmetrical.

Of equal significance are the angular relationships between the coil axis and the lines of force. In moving from the upstream end of the coil toward its center, a given force line tends to approach parallelism with the longitudinal coil axis, and continuing past the locus of maximum density, again swings away from said axis in a curve which has heretofore been assumed in magnetic testing operations to be symmetrical in relation to the approach curve. The fact that the approach cure of a given force line differs in contour from its departure curve introduces errors in test observations taken with secondary coils, whether located at the longitudinal or dimensional center of the usual testing primary or in other positions in relation thereto. The crest of such a curve coincides with the locus above mentioned and not with the dimensional center of the coil.

It was of primary importance, therefore to construct a coil or induction device wherein the locus of points of maximum flux density would lie in a transverse plane which includes the longitudinal center of the coil and in respect to which a curve representing the variation in flux density from the center of the coil to its upstream end should be identical with the curve representing the variation in flux density from the center to the downstream end. It also was important to provide a solenoid having a magnetic field which is symmetrical in respect to variation of flux density in both directions from its central transverse axis, or one in which correction has been made for variation due to reluctance drop.

Greater Accuracy Possible

Such an apparatus is directed to magnetic testing and involves the use of one or more symmetrical induction systems by means of which certain selectivity is achieved, particularly in the separation of indications relating to states or conditions of the tested material as distinguished from physical properties thereof. In other words it is now possible to observe and evaluate more accurately indications relating to states or conditions such as stresses and strains, than is possible with known methods and apparatus for magnetic testing, with a corresponding improved selectivity in respect to the interpretation and evaluation of indications relating to physical properties of a tested specimen; such, for example, as grain size, the presence or absence of segregations, the presence of absence of nonmetallic inclusions, cracks, seams, pipes, flows and other defects.

In the absence of a better explanation of the results observed in applying such method and apparatus to magnetic testing, the results appear to be based upon the hypothesis of certain relationships between the crystals in a magnetizable material in respect to their individual polarity and orientation, and also upon the proposition that these factors may be utilized advantageously for diagnostic purposes under varying controlled conditions such as the angular relationship between the axes of said crystals and the force line tangents at different points in the flux stream and the directional relationship between said stream and forces related to said orientation or polarity of crystals. It is further assumed that each crystal has its own individual polarity, and that as to any given material the polarity and the orientation relationships of its crystals are peculiar to and characteristic of the material.

Considering the directional factor now in an analysis method where the

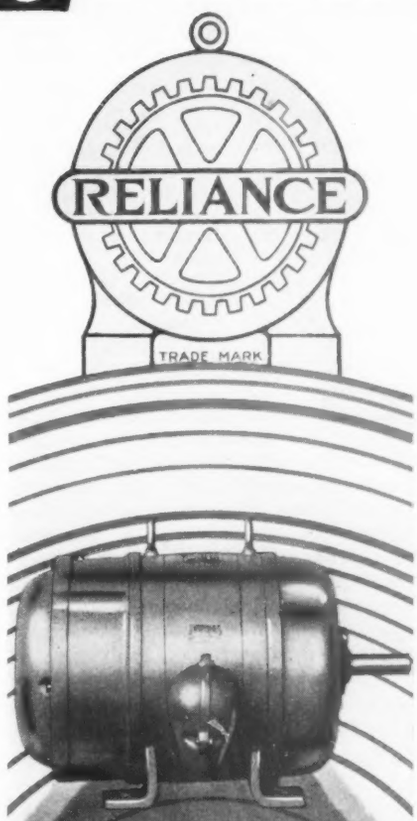
Protected against dirt . . *at* LOWER COST

These enclosed fan-cooled motors strike at the root of most motor troubles by keeping dirt away from the windings and out of air gaps.

By keeping the windings clean the life of the motor is greatly prolonged and interruptions to production are eliminated.

Upkeep is less because constant inspection and cleaning are not needed.

You gain these advantages at reasonable cost. The Reliance design gives positive protection without any increase in size, in most cases, over an open motor of the same rating.



You can save by using these motors in places where iron dust, injurious fumes, moisture, oil, etc., are troublesome factors.

Put one of these motors to work on the dirtiest job you can find and learn how they can help you keep things going steadily at lower cost.

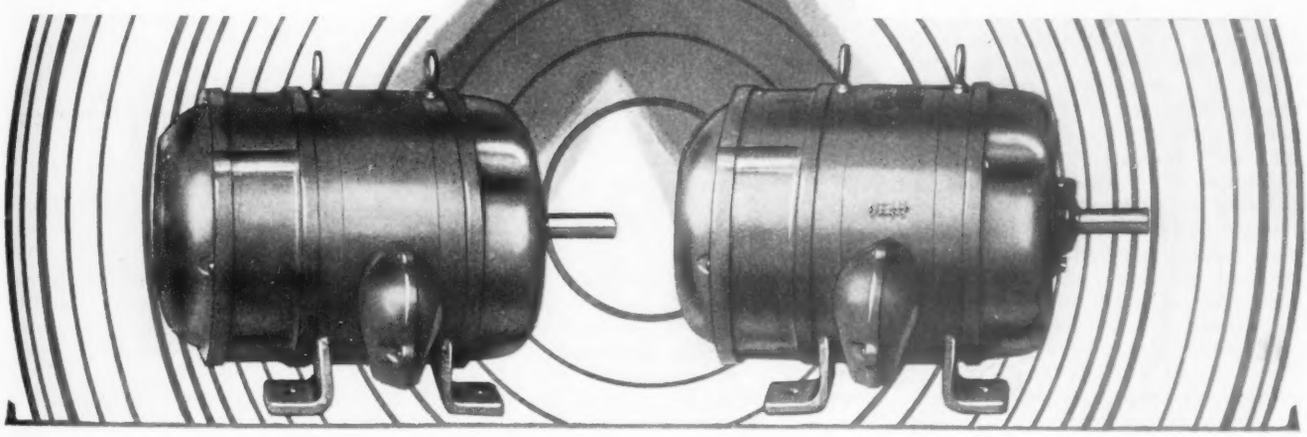
Our Bulletin 107 contains interesting details.

RELIANCE ELECTRIC & ENGINEERING CO.

1082 Ivanhoe Road Cleveland, O.

Branches: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, Toledo.

Representatives: Denver, Kansas City, Knoxville, Los Angeles, San Francisco, Seattle.



Enclosed Fan-cooled Reliance Induction Motors.

The rotor and stator windings are completely enclosed—no outside air comes into contact with them.

RELIANCE A-C D-C MOTORS

with Ball Bearings

orientation and reactive polarity of given group of crystals are the same and where such a group is subjected to a flux stream, there is characteristic reactive effect based upon zero only.

Where the orientation and reactive polarity of associated crystals in any given group are different, the reactive effect, when such a group is subjected to a flux stream, is composite of the reactive effects of the individual crystals.

If a group of crystals is first interposed in a field with the axis of the crystals or the polarity axis thereof in one angular relation to the tangent of a line of force or striation of the flux stream and then is moved to a position with the polarity of the crystals in a different angular relation to the tangent of a line of force of the flux stream, substantially different indications (representing substantially minor structural characteristics) will be registered on suitable indicating devices. This may be referred to conveniently as the polarity force-line-angle-effect.

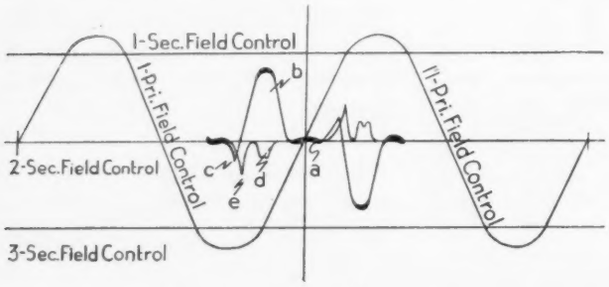


Fig. 1—Diagrammatic representation of an oscillogram as an analytical demonstration of a test specimen, at a single position, taken with a two-element oscillograph

Register Different Indications

Again, if a group of crystals is first interposed in a field with their inherent polarity and orientation forces confluent with the flux stream and is then repositioned with said forces opposed to the flux stream, substantially different indications (representing properties of interposed relations and polarization of the group just mentioned) will be registered. This may be conveniently referred to as the polarity flux direction effect. As to the latter; for example, if the force due to the aggregate polarities or orientation tendencies of the crystals in any given group or the algebraic sum thereof has a positive value or a south-to-north tendency and if this group is placed with the south-to-north arrangement coinciding or confluent with the south-to-north effect of the magnetic flux, then an indicating instrument properly placed will present an indication peculiar to the additive effect of the crystal polarities upon the flux stream. However, if the specimen or group of crystals is reversed in respect to the direction of its longitudinal axis, or in such a way that the polarity of the crystals or their orientation tendency acts in an obstructive sense, as from north-to-south, then there will be a corresponding indication of a subtractive effect reflected in suitable indicating devices properly positioned in the induction system.

In practice, this aspect of the hypothesis is advantageously applied more particularly to the identification or determination of the nature of alloys, as will be more readily understood from the fact that polarization and orientation characteristics of alloys have been observed and tabulated and therefore constitute valuable means for identification and classification. Accordingly, a further purpose of the apparatus is to provide means whereby accurate and reliable identification of alloys may be made on the basis of their observed reactions when subjected to a magnetic flux, and whereby variation indications related to alloy phenomena may be selectively separated from indications related to other physical properties or to states or conditions of the material under test.

Referring again to the polarity striation-angle-effect, it has been found that stresses and strains manifest themselves more definitely when the explored material is in a portion of the flux stream of less than maximum density or where the tangents of flux striations or force lines are in angular relation to the coil axis. These angles, of course, increase in magnitude from approximately zero at the locus of points of maximum flux density to their maxima at points adjacent to or beyond the coil ends. Normally, however, field phenomena beyond the coil ends are not utilized for test purposes, although it may be necessary under some test conditions to take all these factors into consideration.

In accordance with this theory, it is assumed that strain or stress in magnetizable metal accompanies a disarrangement of the normal crystalline structure characteristic of the particular material. This usually involves deviation from the normal orientation, or misdirection or reversal of the crystal polarity. Variations in this respect manifest themselves in such a way that they may be located accurately and identified and separated, particularly where the coil is constructed so that its flux value curve is symmetrical in relation to the center of the longitudinal axis of the coil. Of course, this kind of a coil also is desirable in determinations connected with the flux stream polarity direction relation.

Symmetrical Quality Necessary

In practicing testing methods as outlined, it is important not only that each induction system, as a primary and one or more secondaries, have the symmetrical characteristic referred to, but that two or more, preferably three systems, shall be in balanced relation and strictly identical as to their constants.

Fig. 1 is a diagramatic representation of an oscillogram as an analytical demonstration of a test-specimen, at a single position, taken with a two-element General Electric type oscillograph whereby the one galvanometer worked as voltage and the other galvanometer as an amperage-characteristic indicator.

The oscillations were taken simultaneously; or otherwise expressed in an interval of 1/60 of a cyclic second of which the analysis is as follows: (a) Grain size; (b) Internal stress; (c) Decarbonization; (d) Defect; and (e) Decarbonization.

Fig. 2 is the combined image of the same area aforementioned recorded on one galvanometer only, including the image of material as a phenomenon. It is remarkable to observe the accuracy of reproduction of the various physical constituents and phenomena recorded and verified later by actual examination of the specimen.

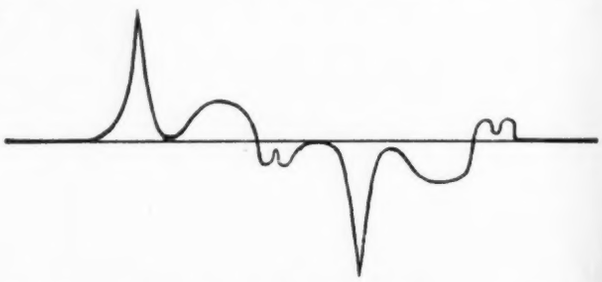


Fig. 2 — Combined image of the same area shown in Fig. 1 recorded on one galvanometer only

This case proved beyond doubt the inter-relationship of stresses, defects, and decarbonization occurring within a very small volumetrical area, reproduced in the oscillograph by the phase relation of *b* to *d* and *c* to *e*, respectively. As can be seen, the images have been taken slightly shifted in their phase relations, allowing a better normal observation. Further research work is necessary in order to tabulate more definitely the magnetic results.

Machines Speed Production of Eccentric Bearings

A DIFFICULT manufacturing problem, worked out to the advantage of the automobile manfacturer, is a new method of making eccentric bearings for the eccentric tie rod of steering mechanisms, at the Detroit plant of Thompson Products Inc. Former practice was to produce these pieces, which are of an odd shape and design, by a machining and coining process. However, recent examinations of bearings manufactured in this manner and given long road tests, revealed the ball seat was not wearing as well as desired. Engineers attributed this to crystallization of the metal structure during coining, which left the bearing in such a condition that it did not respond readily to heat treatment. In addition, it was difficult to make the bearings conform to the close limits set by this process, while the cost per bearing was too high in proportion to other costs.

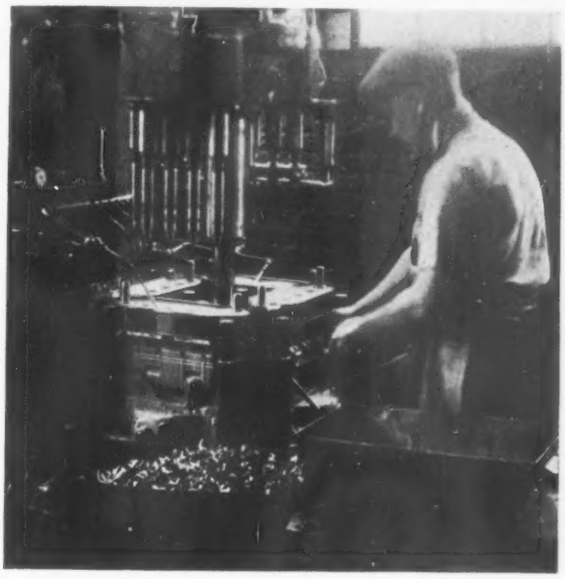
Special Machines Designed

To plan another system of production involved many serious considerations. Because of their eccentricity, as shown in an accompanying illustration, the bearings were of an odd shape and difficult to hold or clamp during the process. The operations, while not numerous, were difficult, and required the designing of special machinery to insure the accuracy desired. In this respect, machine tool builders promised their aid in designing the machines, but would not guarantee results.

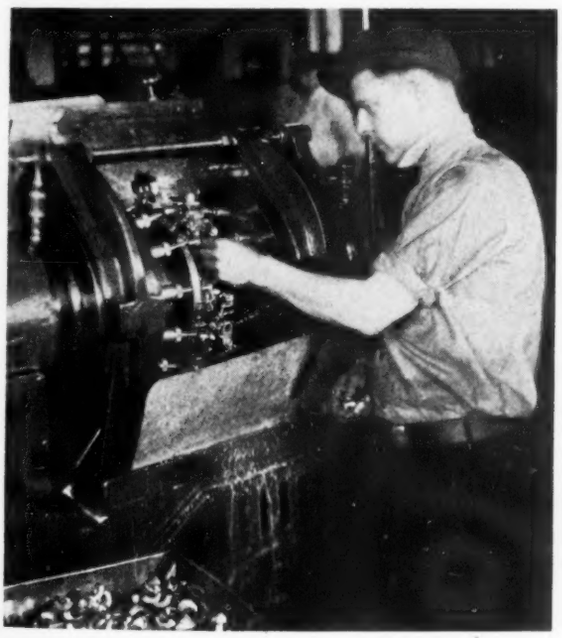
Consulting with steel manufacturers, it was arranged that the stock would be delivered in lengths of eccentric section. These are made by rolling SAE 1020 high manganese steel into strips, and cold drawing through dies for forming and final sizing. The section is held to a limit of 0.002-inch during drawing, this being of great importance to subsequent operations on the part.

Lengths are inspected carefully for flaws and size at the plant. They are cut into blanks on a standard milling machine with specially designed cutting teeth and clamping fixtures. Twelve blanks are cut at a pass.

Machining the spherical bearing seat is the next operation. This is done on a special machine designed by Thompson engineers and the Baker Bros. Co., Toledo, O. It consists of a four station fixture mounted on a rotating table actuated by a cam traveling with a multiple-spindle head. There are three working and one loading positions of the fixture. Four blanks are placed in the fixture and as the table rotates, roughing, semi-roughing and finishing tools come into position, finishing the seat to within 0.001-inch. Four bearing seats are completed with each cycle of the table. This machine is operated hydraulically, the tools feeding down against the solid stock.



MACHINE developed for machining the spherical seat of the bearing. A rotating table moves the parts through four positions — charging, roughing, semi-roughing and finishing

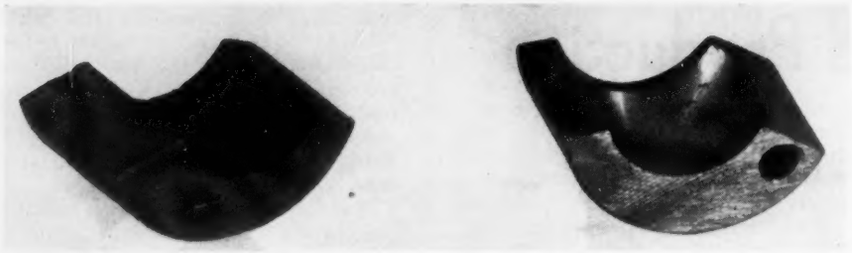


SPECIAL high-production horizontal drilling machine, multiple-spindle type, for drilling holes in the bearings. Spindles and fixture rotate as the drilling progresses. Note the angle of the spindles

Drilled at Angle

Each bearing is drilled with a hole into which a spring is later clipped. Because of the difficult angle at which these holes are drilled it was necessary to design another machine. This was built by the Excello Machine Co., Detroit. It is designed so that spindles and fixture rotate together about a horizontal axis. The pieces are placed in the fixture and automatically clamped as it revolves. Then the spindles come into play, and as the fixture reaches the bottom of the revolution, the pieces are automatically released. This machine drills accurately, and speeds up production.

Edges on the bearings are chamfered, the pieces are washed, and then placed in rotary gas furnaces for carburizing. Heat treatment consists of heating slowly to 1600 de-



(Left)—First step in production of bearing, blank cut from a length of specially rolled eccentric section. (Right)—Appearance of the eccentric bearing after the seat is machined and the spring clip hole drilled

grees Fahr. and holding at that point for 2 hours. The temperature is then run to 1620 degrees, and the pieces quenched directly on the rising temperature to get toughness. After hardening, the bearings read 82-85 scaleroscope, and have a tough flexible core.

Burnishing is done with emery powder, followed by washing in a kerosene bath. The bearings are then subjected to a 100 per cent inspection, including radius of the spherical seat, depth of radius, concentricity, relation of concentricity to outside radius of bearing, and hardness in ball seat.

Bearings made by this new equipment measure up to the high standards of accuracy set. Production has been speeded up, costs reduced, and exhaustive tests carried on show that the bearings well withstand wear and shocks of the road transmitted through the steering system.

New England Steel Treaters Plan Sectional Meeting

Six New England chapters of the American Society for Steel Treating will hold a spring sectional meeting at Hartford, Conn., April 14, 1931. The chapters participating will be Boston, Providence, R. I., Worcester and Springfield, Mass., and Hartford and New Haven, Conn. Dr. V. O. Homerberg, professor of physical Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., is to present at the meeting a resume of developments in nitriding including a digest of the experimental and practical achievements of this method of hardening. Other papers scheduled for presentation are "X-Ray as it Applied to Industry," by E. W. Page, General Electric X-Ray Corp., Chicago, and "The Metallurgist in Industry," by Dr. Zay Jeffries, consulting engineer, Cleveland. Inspection trips to principal plants in the Hartford area are being arranged.

Adopt Track Bolt Standards

American standards on track bolts and nuts based on a study of the different types of track bolts used by the various railroads and electric railways in the United States and Canada have been approved by the American Standards association and recommended for use. Particular attention has been given to the reduction of the number of wrench openings needed. Tables giving dimensions of oval-neck track bolts, elliptic-neck track bolts and track-bolt nuts are given. During the development of the standard, tests were carried out by the railroads and manufacturers of track bolts on samples made to the dimensions of the standard.

United States has one-third the world's railroad mileage, with 250,026 out of a total 776,834 miles.

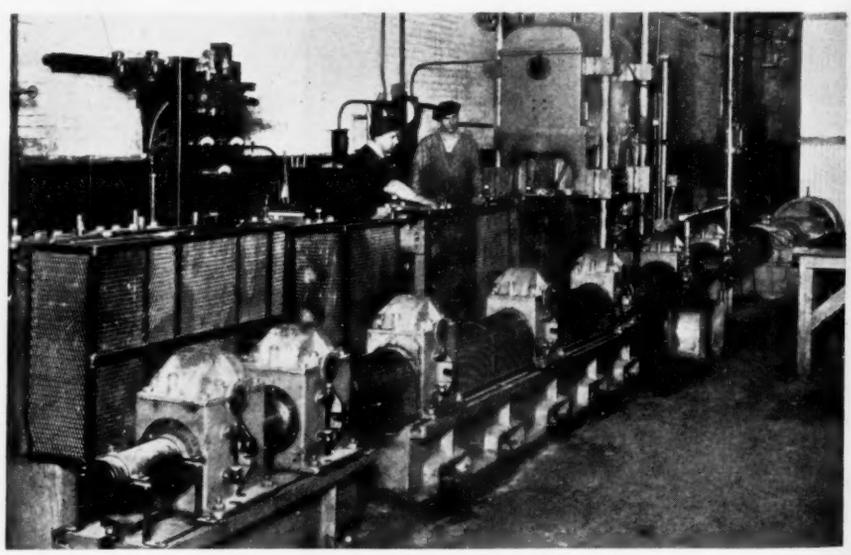
Perfects Machine for Electric Welding High-Carbon Structural Steel Tubes

CLIMAXING two years of experimental work by company engineers, Steel & Tubes Inc., Cleveland, a subsidiary of Republic Steel Corp., has announced the perfection of a new process for electrically seam welding high-carbon structural steel tubing. Equipment for the welding operation, shown in the accompanying illustration, is located at the Elyria, O., plant of the company and is an adaptation of the patented Johnston process of electric welding with alternating current of high amperage owned and developed by Steel & Tubes Inc.

The new electrically welded high-carbon tubing differs from ordinary seeel tubing in its greater strength and rigidity. In previous forming methods the tubing was rolled into an open seam or butted tube, and the seam closed by brazing with spelter, a soft nonferrous material. The electric welding process forms a union of the tube metal itself.

The welded tube is homogeneous and has a smooth finish with the welded seam rolled down so as to become almost imperceptible. Tests have indicated that the tubing will stand up under severe bending and forming operations. It also can be hot galvanized, not commercially possible with the brazed tubing.

Equipment recently placed in operation for the manufacture of the material will handle the tubing in several gages and intermediate sizes ranging from ⅞-inch outside diameter up to and including 2⅜ inches outside diameter, in round, square and rectangular shapes. Applications for the product include farm implements, dairy equipment, bedsteads, scaffolding, shores, towers, wheelbarrows, playground equipment, fenceposts and similar devices.



Electric welding equipment in new installation at Elyria, O., for forming high-carbon structural steel tubing

MORGAN

Steel Plant Equipment

THE
MORGAN ENGINEERING
COMPANY
ALLIANCE, OHIO, U.S.A.

Seek Yardsticks To Measure Finish and Machinability

MACHINE shop practice in its various phases intimately related to modern industry, came in for a generous amount of attention during the 51st annual meeting of the American Society of Mechanical Engineers held in New York, Dec. 1 to 5. In addition to two sessions devoted entirely to this subject, two other sessions were concerned with it in a large measure, and many others touched upon problems of metalworking plants such as management, materials handling, employment and apprenticeship training, and lubrication.

The proportion of attention given to matters along this line is indicative of the growing recognition accorded to the production metalworking industries by a society which for many years was looked upon as primarily a power group. It is also indicative of the increasing willingness of engineers and executives in the metalworking industries—in the machine tool industry particularly—to prepare and to discuss papers and otherwise to participate actively in the affairs of the society.

Measure of Finish Is Needed

Necessity for getting away from rule of thumb methods, which have prevailed to a surprising extent in the metalworking industries, extends not only to machine tool design, but to the measurement of the quality of finish. Micrometer mechanisms and the more precise laboratory instruments give measurements of size even to millionths of inches, hardness testers give accurate comparisons in that respect, but standards of finish and methods of determining finish quality remain to be worked out.

That situation was brought out forcibly by R. E. W. Harrison, engineering director, Cincinnati Grinders Inc., Cincinnati, and by a report on "Microscopical Examination of Cross-Section of Surfaces," by Dr. C. B. Sawyer, president, Brush Laboratories, Cleveland. Mr. Harrison mentioned the primitive methods now employed in testing the quality of ground surfaces, rubbing the fingernail across them, or even drawing them between the teeth, for instance. By means of photomicrographs he showed how deceptive mere visual examination of a ground surface can be, and how rough from a precision point of view even a lapped surface can be.

From these slides, and magnified sections of similar work prepared by Dr. Sawyer it was made clear what a destructive process the "running in" of an automobile or other piece of machinery can be. Essentially that process consists in making every bearing do its own lapping, in the meantime feeding metallic particles into the oil system to abrade vital surfaces elsewhere.

Suggested Finish Test

Mr. Harrison did not stop at suggesting the need for methods of measuring surface quality and standardizing it, but made constructive suggestions as to how this may be done. In addition to microscopic examination, he has experimented with apparatus giving both sound and visual measurements by means of a phonograph pick-up, audio frequency amplifier, radio loud speaker and a millivoltmeter. By drawing the phonograph needle over the ground surface, an indication of its quality is given by the sound emitted by the loud speaker and by the reaction of the voltmeter.

Mr. Harrison's paper met with lively response and probably will inspire several companies to inaugurate research along similar lines. James M. Heald, general manager, Heald Machine Co., Worcester, Mass., called attention to the amount of research now going on in the machine tool industry, the cost and importance of which is not realized generally.

J. W. Baugher Jr., engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., gave at the same session a presentation of his test results on "Transmission of Torque by Means of Press and Shrink Fits." On account of the increasing use of press and shrink fits without keys for the transmission of power, the equations and graphs developed from Mr. Baugher's experiments are a valuable contribution to the technique of machine design. Because of their necessarily complicated nature these formulas and graphs cannot be discussed at length. The complete paper deserves careful study by machine designers.

The adaptation of optical instruments to use in the plant is progressing rapidly, and two cases of entirely different character received attention at one session. Maynard L. Sandell, Eastman Kodak Co., Rochester, N. Y., showed many practical applications of 16-millimeter movies, both within an organization and in the presentation of the capabilities of a company and its products to the outside world. In the first case common uses of the narrow films are for the recording of laboratory tests, including microphotographic work, and in the training of workers in standardized operations. In the second case profitable use is made of the films in sales work, particularly in the demonstration of large equipment.

Mr. Sandell gave point to his paper by running several reels of film made up of sections produced by various companies either for use within their own organizations or outside. One section, showing the building up of an automobile tire, was of particular interest in that it had solved the problem of transferring this new method quickly from a plant in the United States to an allied plant in England after printed instructions had failed.

In a paper on the "Application of Spectroscopic Apparatus to Industry," Charles C. Nitchie, Bausch & Lomb Optical Co., Rochester, N. Y., gave an interesting account of how these instruments of the scientist have been adapted to industrial use. His slides demonstrated the relative simplicity of spectral analyses of metals by means of the commercial quartz spectrograph, which produces a permanent photographic record readily interpreted as a qualitative analysis.

Research on Machinability

Since the days of the late Frederick W. Taylor's notable researches into the art of cutting metals, important and almost revolutionary developments in cutting materials and materials cut have taken place. That is true particularly of the last five years, during which wide extentions have been made in the use of alloy steels in machine design and during which improved high-speed steels and tungsten-carbide cutting materials have come into being. While Taylor's work remains valuable as a foundation to scientific metal cutting practice, there is need for a great deal of additional research on the new materials. Certain investigators are meeting this need as rapidly as time and available funds will allow—among them O. W. Boston, director, department of engineering shops, University of Michigan, Ann Arbor, Mich.

Professor Boston presented at the general session results of machinability tests on a number of different metal test bars of definitely known chemical and physical characteristics. In seeking a definite "yardstick" of machinability, Prof. Boston recorded power consumption, penetration pressure, and thrust and torque in connection with machining the several specimens. When the data were used in plotting curves, some materials indicated machinability inversely proportional to hardness, while others showed opposite tendencies. Tables also were prepared showing power required to

remove 1 cubic inch of metal per minute under certain standard conditions.

Prof. Boston's findings were borne out by similar results obtained by Alvin L. Davis, research engineer, Scovill Mfg. Co., Waterbury, Conn. In discussing the results, Alfred V. de Forest, Welding Engineering & Research Corp., New York, pointed out the importance of these steps toward eventual conclusions which will be of great value to the metal producing and using industries.

A session was devoted to the subject of cutting tools, which amounted to a symposium on modern applications of tool steels, stellite and tungsten carbide. A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., Hartford, Conn., dealt in a broad way with tool steel tools, covering not only recent improvements in the alloys and their heat treatment, but also entering intimately into the design of drills, reamers, milling cutters, saws, etc., as well as touching upon the relation of cutting fluids to the performance of such tools.

Poor Tools Hamper Good Machines

This paper was liberally illustrated by slides showing representative tools, photomicrographs showing etched sections of properly and improperly heat treated tools, and diagrams of approved shapes of cutting blades. In closing, he rose to the defense of machine tool builders by saying that fine and costly machine tools frequently are condemned because cheap, poor quality cutting tools are used with it, thereby limiting performance seriously.

The subject of stellite was covered in a joint paper by W. A. Becker and E. E. Gordon, sales engineers, Haynes Stellite Co., Kokomo, Ind., and W. A. Wissler, metallurgist, Union Carbide & Carbon Co., Long Island City, New York. The paper briefly described the physical properties of this cobalt-chromium-tungsten alloy, including tests of its hardness up to 1100 degrees Cent. Various applications of the alloy were described and specific cases of increased production by its use were cited. Slides showing successful stellite tooling set-ups were shown, together with tables of comparative cutting speeds in milling, boring and turning various kinds of material under standard production conditions.

It was pointed out that the capabilities of this material are due not to unusual hardness at ordinary temperatures, but rather to its ability to retain its hardness at temperatures above 500 degrees Cent. In conclusion it was stated that in machining cast iron this alloy frequently gives increases in production ranging from 20 to 140 per cent and increases in number of pieces per grind ranging from 2 to 6, while in mild steel the increases not uncommonly are from 15 to 125 per cent and 1½ to 6 pieces per grind.

Application of cemented tungsten carbide to cutting tools was covered by L. J. St. Clair, Philadelphia district manager, Carboloy Co. After reviewing the development of this new cutting material in Germany, Mr. St. Clair enumerated the unusual physical properties, including its hardness of 87 to 92 on the Rockwell scale where "infinite hardness" is 100.

After describing the method of producing cemented tungsten carbide under commercial conditions, the details of copper brazing it to tool shanks were covered, including necessary precautions against its oxidation. In enumerating the factors for successful use of tungsten carbide tools the author listed; design of the tool itself, condition of the machine tool on which it is used, care of the tool in operation, and grinding of the tool, as of primary importance. He stressed the necessity for solid support for the tool tip, for putting the machine tool into first class condition to avoid any looseness and vibration, for not forcing the tool to its limit and for honing it now and then between grinds, and for having it ground when necessary by a specialist equipped with suitable wheels and a suitable grinding machine.

During an active discussion following these papers, Coleman Sellers 3rd, who has run extensive tests on tungsten-carbide tools at the plant of William Sellers & Co., Philadelphia, further stressed the importance of careful machine grinding of the tools by a specialist, adding that he had found lapping to be unnecessary when the grinding was performed with care. Mr. Sellers remarked upon the evident need of early development of standard tungsten-carbide practice based upon experimental tests. This reflection was inspired by the lack of such standard practice as revealed by a recent survey made by the American Society of Mechanical Engineers.

Booklet Gives Proceedings of Semiannual Meeting

Proceedings of the semiannual meeting of the Concrete Reinforcing Steel institute, Chicago, held at Briarcliff, N. Y., last October, have been published in booklet form by the institute. The booklet includes reprints of the addresses and papers, reports of committees and departments of the institute, a list of members, registration at the meeting, and a discussion of trade practice violations as reported at the meeting.

Engineers See Lubrication and Accident Prevention as Requiring Attention

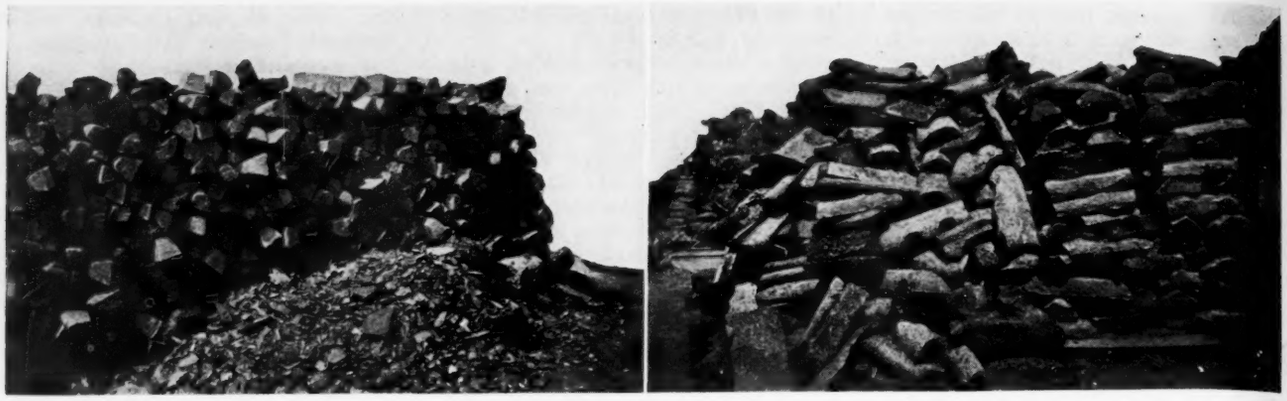
ASIDE from recommending proper lubricants, an important role of the lubrication engineer is to design machinery for their effective use. This was the opinion of William F. Parrish, consulting lubrication engineer, New York, expressed at a session of lubrication during the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 1-5.

The speaker gave an interesting review of the history of lubrication, tracing the developments from the days of whale oil down to the era of mineral oils. His statements made it obvious that up to a comparatively few years ago the limitation of the older lubricants would have precluded the use of high-speed, heavy-duty machinery and that operating at high temperatures.

Inasmuch as most of the important developments in lubrication have come about within the memory of older engineers, Mr. Parrish suggested prompt and full attention to a questionnaire being prepared by the petroleum division of the American Society of Mechanical Engineers and designed to gather for permanent record the history of industrial lubrication.

Speaking during a symposium on industrial accident prevention, L. W. Wallace, executive secretary, American Engineering council, Washington, characterized the accident toll as one of the heaviest economic losses suffered in the United States. Among the statistics upholding this contention, Mr. Wallace pointed to 31,000 lives lost in a single year through automobile accidents and a measurable economic loss from accidents of $2.26 per capita per year for every inhabitant of the state of New York.

In the same symposium it was brought out that 98 per cent of industrial accidents are preventable and that at least 50 per cent of them can be prevented by ordinary precautions. One precaution is to treat every accident as a danger signal of a condition to be remedied to avoid repetition. It has been demonstrated repeatedly that a safe plant is likewise a productive plant—specifically, that a safe plant is likely to be about 11 times as productive as an unsafe one.



Piles of sand-cast pig iron showing wastage (left) as a result of handling and (right) uneven size and rough appearance

Machine-Cast Pig Iron Has Greater Uniformity

BY F. B. RIGGAN and L. S. MORGAN

ALABAMA leads the world in the production of gray-iron pressure water pipe and also soil pipe. North Alabama, and more particularly the greater Birmingham district, is unique in that it contains coal, ore, and limestone used in making pig iron, all within a stone's throw of each other.

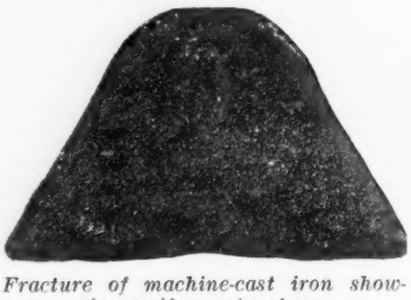
Birmingham pig iron always has been noted for its quality, but recent changes in foundry requirements, have necessitated changes in pig iron accordingly. The gray iron casting industry has had an awakening during recent years, because of improved quality and competition of the other ferrous metals. The gray iron foundryman has followed suit, in giving to the trade a gray iron of such properties that it cannot be overlooked by engineers. It has answered the challenge of other metals, and has proved that it has a permanent and most necessary place in the modern industrial field.

Pipe Specifications Tightening

New and more drastic specifications for pipe, fittings, and machinery castings require a constant supply of uniformly high-quality pig iron. The continuance of the supply of southern pig iron is insured by enormous ore reserves. These factors, coupled with favorable climate and facilities for shipping by rail and water, have built up industries which consume large tonnages of pig iron. A few years ago 90 per cent of Birmingham pig iron was shipped north and west, while recently, about 80 per cent has been consumed at home.

A few years ago, gray iron with a strength of 19,000 pounds per square inch was considered satisfactory; today ordinary iron ranges from 21,000 to 30,000 pounds. Special alloy irons may run as high as 75,000 pounds per square inch and high-test iron will show from 30,000 to 40,000 pounds. To meet these new conditions, a large amount of research, in the foundry and in the laboratory has been performed. Continuous and centrifugal processes requiring constant analysis and temperature were not possible until the melting of iron in the cupola changed from an art to scientific procedure. Control of pouring and cooling temperatures, of molding sand conditions, and of many other variables, have combined to make a much more uniform product. At the same time metallurgical research has covered greatly improved strengths, melting methods, machinability, heat treatment, the use of alloys, shock resistance, etc.

Many of these improvements would have been impossible, without a uniform supply of pig iron. When difficulty formerly was encountered in the foundry, the molder would check his sand, the cupola man his charging and coke, and if the cause was not located, the difficulty inevitably was charged to the pig iron, because it was the unknown factor. Today, conditions have changed. Investigations disclose that each pig iron has inherent characteristics, which are transmitted to the castings.



Fracture of machine-cast iron showing uniform structure

While foundrymen and technologists have been making strides in improving gray iron, blast furnacemen have not been idle, although their work has been attended by far less publicity. Realizing that one of the needs of the foundry, was a more uniform, cleaner, pig iron, furnace operators started improvements, beginning at their mines. As a first step, the ores were crushed and sized. Coke was treated in a similar manner, all of which made for better distribution of the stock, which is one of the first requisites for uniform operation.

Next the oxygen input was brought under closer control by better equipment, and more accurate methods for tying in furnace operations with meteorological conditions.

Machines Installed

Probably the most important improvement in recent years in Southern pig iron, has been the installation of pig casting machines by all the large producers. It was a death-blow to the old melter at the small foundry, where all mixes were made by fracture. The larger, well-equipped foundries looked with suspicion at some of the first iron cast in chills, owing to the pitted appearance, and rough, kish-like surface. Moreover, the pigs broke into three or four pieces while being unloaded from the car, thus making handling and racking more difficult.

These earlier difficulties have been eliminated by various ingenious expedients. One producer has solved his problems by intensive research and experimentation at the pig-casting machine. The term "chill-pigs" at first was accurate, since most of the pigs had a heavy, white chill where they had come in contact with the metal mold. This difficulty was eliminated by the use of a heavy coating of lime and salt which was sprayed on the hot mold as it returned to the pouring ladle. The molds retain ample heat to complete-

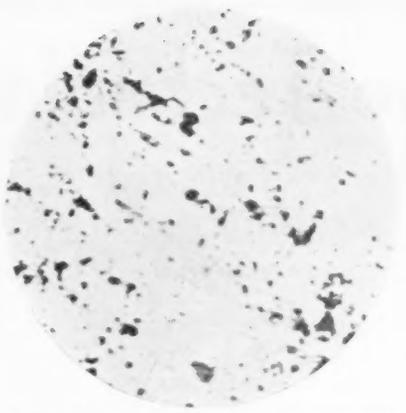
ly dry the coating before it again is subjected to the molten iron. This coating has the further advantage of effecting a slight desulphurization of the iron. The iron is not sprayed with water while molten, because the distance of 120 feet to the "gentle" sprays, gives the iron time to cool to about 1600 degrees Fahr. Then just enough water is added to cause the kish and slag on top of the pig to peel off, as the pig drops from the mold. This coating and the delayed cooling practically have eliminated the tendency of machine-cast iron to break. This process also has made a vast improvement in the surface and appearance of the iron.

Mixer Cars Used

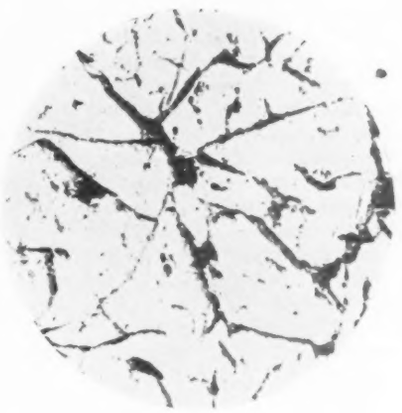
One of the advantages inherent with the newer pig iron, is the use of a large mixer-type ladle, which holds an entire cast and eliminates variations in analysis from beginning to end of the cast. Since the iron is held for some time in the ladle, it has every opportunity to clean itself by permitting the entrained slag to rise to the top; at the same time any possible dissolved oxides or gases have ample time to escape.

It is impossible, of course, to hold the molten gray iron for any considerable length of time, after melting in the cupola, therefore this slow purification of the molten pig iron has decided advantages for the production of gray iron castings.

After the impurities have risen to the top, they are removed in a second skimming operation. Any slag which may have escaped this second cleaning, is removed by a third skimming operation, just before the iron enters the traveling molds. In the molds, there is a slight reaction between the specially-prepared mold coating, and the still molten metal. As stated, this action effects a slight desulphurization, and also removes any small amounts of oxides, resulting from pouring the metal into the molds. There is sufficient time for this reaction, because the iron is molten for a considerable time, before the cooling operation is initiated. This leaves



Edge of early chill-cast pig iron. X100



Edge of improved machine-cast pig iron. X100

each pig with a smooth, clean, surface, and uniform fracture, as shown in the cross-section of a pig.

Improvements in pig iron always react to the benefit of the ultimate consumer, who in this case is enabled to receive an even stronger and more uniform gray-iron casting than in the past. Incidentally, this newer type of pig iron has certain specific advantages for the gray-iron foundry. The skimming operations rid the pig iron of about 3 per cent of impurities. This makes for cleaner pig iron and cleaner castings and also reduces melting losses in the cupola. Moreover, it affects a corresponding saving in cupola linings, coke, and limerock. The saving to the foundry, by not paying for a large amount of molding sand adhering to the pigs, is obvious.

The machine cast pigs, being of uniform weight, with almost no breakage, reduce handling costs, and have the further advantage of more accurate charges for the cupola, in case the pigs are counted, instead of being weighed.

For many years the South labored under economic disadvantages, which retarded modernization. Today, these disadvantages have been swept aside. With the inherent quality in self-fluxing ores, with efficient control of blast furnace operations, and with the production of high-quality gray iron always in mind, the Birmingham furnaces today are living up to the fine traditions of quality handed down to them by their predecessors.

Metallurgical Developments Increase Use of Sinter

Sinter produced from iron ore or blast-furnace flue dust is coming into wider use, according to the bureau of mines, Washington. Many blast-furnace plants have installed machines for sintering flue dust. High moisture ores are being sintered on the iron ranges. Beneficiation of ores is increasing and will produce fine concentrates which must be sintered or agglomerated in some manner. To get information on the metallurgical value of sinter, the North Central experiment station of the bureau of mines, Minneapolis, in co-operation with the University of Minnesota, is conducting a series of tests on the relative ease with which various sinters and various iron ores can be converted into metal by gas of the composition produced in the hearth of blast furnaces. Sinter is porous in structure, but its relative reductibility compared to iron ore is not known. It is generally assumed that sinter reduces very readily.

Pile of machine-cast pig iron showing the smooth surface and clean appearance of the metal

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

FABRICATION:

Channel Beam Stresses

Investigation of the torsional effect of transverse bending loads on channel beams, by Fred B. Seely, William J. Putnam and William L. Schwalbe, presented in bulletin No. 211 issued by engineering experiment station, University of Illinois, 64 pp., 6 tables, 24 illusts.

The shapes of steel rolled I-beams and channels have been designed with the main purpose of giving large resistance to bending in accordance with the simple flexure theory for beams; the torsional strength and stiffness of such sections are known to be relatively small. To develop the bending resistance of I-beams and channels without permitting them to twist, it has been assumed very generally that transverse bending loads on these sections should be applied through the centroids of the transverse cross-sections and parallel to the webs. In the case of I-beams this assumption is correct, but when a channel is so loaded it twists appreciably as it bends. The bulletin contains the results of tests and of analyses to determine where the load should be applied on steel rolled channels to produce bending without twisting, and also to determine the longitudinal stress in a channel beam if the channel is loaded so that twisting accompanies bending.

—STEEL 12-18-30

Welding High Structures

A resume of the present position of arc welding with regard to its use on high structures, presented by Gilbert D. Fish, in Journal of the American Welding society, November 1930, p. 19, 6 pp., 2 illusts.

As the height of buildings is increased, the stresses developed as a direct result of wind pressure, and the bracing required to combat this force become correspondingly more important. The principal office to be performed by the structural fabrication in addition to its other duties is the stiffening of the joint sufficiently so as to successfully combat wind stresses and to provide comfort for tenants on the upper floors. This must be accomplished without the addition of or the placing of shapes in such a manner that they would interfere with architectural treatment. The author recommends welding for joints subjected to wind stress, especially in high structures, as a welded joint may be made extremely rigid without the addition of bothersome material. Welded joints also may be constructed so that they are flexible in order to avoid dangerous secondary stresses. With this range in possibility, no difficulties are presented in the fabrication by welding of structures as high or higher than any that have been constructed up to the present time.

—STEEL 12-18-30

USES:

Induction Furnaces

Application of high-frequency electric furnaces for making tool steel, discussed by J. A. Succop, in Metal Progress, December 1930, p. 40, 5 pp., 3 illusts.

Erosion of the refractory appears to be a less difficult problem than the expansion and contraction which occurs in the lining during the cycle of each heat. Close control can be exercised over the chemical composition of the metal produced but most careful weighing and most accurate analysis of the charge materials are necessary. Elements such as tungsten in high percentages are known to be distributed evenly throughout an induction furnace bath. Any segregation appearing in the finished steel, therefore, is due entirely to ingot solidification. While the induction furnace has demonstrated its value in the melting of quality tool steels, it nevertheless is passing through a transitional period during which it will assume more static characteristics.

—STEEL 12-18-30

Oxygen Lance

Use of this device in the routine production of open-hearth steel, discussed in Oxy-Acetylene Tips, December 1930, p. 83, 2½ pp., 5 illusts.

In tapping an open-hearth furnace one workman handles the lance while a second workman adjusts the pressure. The end of the lance first is held in the furnace until it becomes red hot. Oxygen then is turned on gradually and the end of the lance is placed against the plug in the tap hole. The pressure is increased as the workman moves the lance in and out and cuts a hole of the correct diameter. Usually about 1 minute after the start of this operation the plug has been pierced. Removal of hot tops from nickel steel ingots by the use of the oxygen lance also is explained. Other common uses of this device are the reclamation of furnace spills, frozen ladles and salamanders.

—STEEL 12-18-30

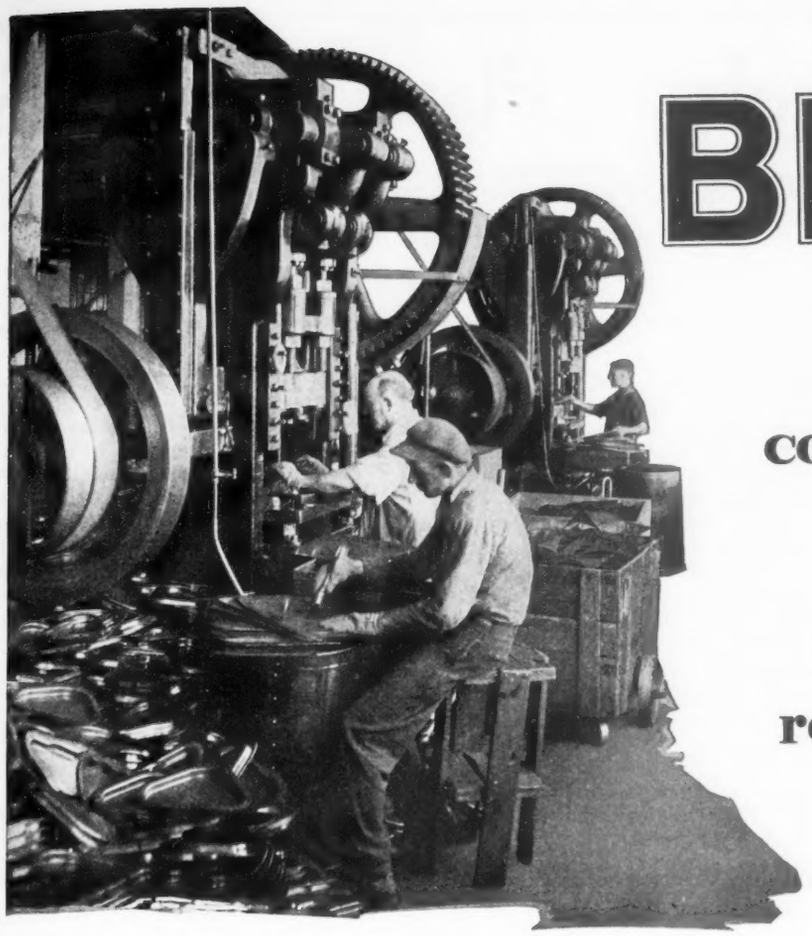
PRODUCTION:

Brackelsberg Process

Melting technique involved in making acid steel by the Brackelsberg process, discussed in Metallurgia, November 1930, p. 23, 2½ pp., 2 tables, 3 illusts.

The high temperature of the coal dust flame, its uniform spread in the furnace space, its excellent heat transmission to the charge and the economical wear of the furnace lining represent the essential features of the process. The furnace, which consists of a cylindrical body with cone-shaped ends, is capable of being rotated when in operation for melting and can be tipped for tapping, charging and relining and the mechanism is so arranged that both rotating and tipping movements can be made simultaneously. The use of a simple recuperator to preheat the air fed into the combustion chamber to between 200 to 300 degrees Cent. makes it possible to obtain temperatures up to about 1800 degrees Cent. and thus insure quick melting of steel. Melting down is accelerated by rotating the furnace. The lining used in the experimental furnace consisted of quartzite refractory material which has, in addition, the necessary clay bond.

—STEEL 12-18-30



BLISS

The complete line

A Press for every requirement

YOU can safely depend on the recommendations of Bliss to provide the most efficient type of machine for your particular sheet metal operations.

The wide range of equipment built by Bliss covers every conceivable requirement in sheet metal punching, piercing, blanking, embossing, stamping or forming. Bliss recommendations are therefore not restricted by an incomplete line of equipment.

No matter what material, quantity, size or shape of sheet metal parts you may require, there is a suitable Bliss type that has fully proven its efficiency and dependability in hundreds of installations.

E. W. BLISS CO. MAIN OFFICE AND WORKS **BROOKLYN, N. Y., U. S. A.**

Sales Offices

DETROIT	CLEVELAND	CHICAGO	CINCINNATI	ROCHESTER	NEW HAVEN	BOSTON	PHILADELPHIA
Gen. Motors Bldg.	Guarantee Title Bldg.	1900 N. Kilbourn Ave.	Union Trust Bldg.	Times Union Bldg.	2d Nat. Bk. Bldg.	Weld Bldg.	Nat. Bk. of N. Phila. Bldg.

American Factories: BROOKLYN, N. Y. HASTINGS, MICH. SALEM, OHIO

Foreign Sales Offices and Factories

ENGLAND, Pocock St., Blackfriars Rd., S. E., London ITALY, 345 Via Nizza, Turin FRANCE, 54 Blvd. Victor-Hugo, St. Ouen Sur Seine, Paris

No. 565

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Lathe Does Form Machining Under Electric Control

Monarch Machine Tool Co., Sidney, O., has developed a combination of its precision engine lathe and the automatic electric control mechanism built by the Keller Mechanical Engineering Corp., Brooklyn, N. Y., which makes possible the turning and boring of intricate shapes at high speed and with but little operative attention. The combination, shown in the accompanying illustration, can be used for the economical production of die casting dies, molds for glass bottles, can forming dies, lens grinding dies, chucks for sheet metal spinning, punches and dies for hollow ware, molds for plastic materials, formed rolls for sheet metal, forming tools for automatics, etc.

Design and Operation

The lathe illustrated is one of the standard 18-inch x 6-foot helical geared head models equipped with tapered roller bearings. The control unit consists of three main parts: A standard Keller-type tracer, two magnet boxes and a control cabinet. The tracer mechanism is mounted on a bracket in a fixed relation to the cutting tool, the contact points being protected from chips and dirt by a cover. The front magnet box is geared to the feed rod of the lathe, while the rear magnet box is geared to the lead screw. A thin metal templet is mounted on a bracket at the back of the lathe, parallel to the longitudinal or to the cross feeds, depending upon the position of the work in the lathe.

The control mechanism can be applied to lathes from 14 to 36-inch swing, and work can be formed automatically up to the full capacity of the lathe, both in swing and in length. The control cabinet is located for convenience in operating and its two rheostat knobs give 96 changes on both lengthwise and cross feeds.

After the directional switch button is pressed the action of the machine is automatic. The tracer moves to the templet, automatically maintaining light mechanical contact with the templet. The path of the cutting tool conforms exactly to the contour of the templet, accuracy to 0.001 inch and cuts to the full capacity of the lathe being possible. The tracer operates relays by a 14 volt direct current not exceeding 5 amperes, which in turn actuates magnetic clutches by the regular 110-volt shop current.

◆

Speed Reducers Provide Straight-Line Drive

Production Equipment Co., Cleveland, is manufacturing new motorized speed reducers which consist of a standard heavy-duty electric motor with an integral planetary gear reduction unit mounted in an oil-tight housing. The reducer, which is available in capacities up to and including 20 horsepower, is a compact efficient unit. All motors are built by the company and can be supplied in single speed, multispeed, enclosed and high-torque designs for either horizontal or vertical mounting. The reducers provide a straight-line drive with final driving speeds of from 50 to 550 revolutions per minute.

◆

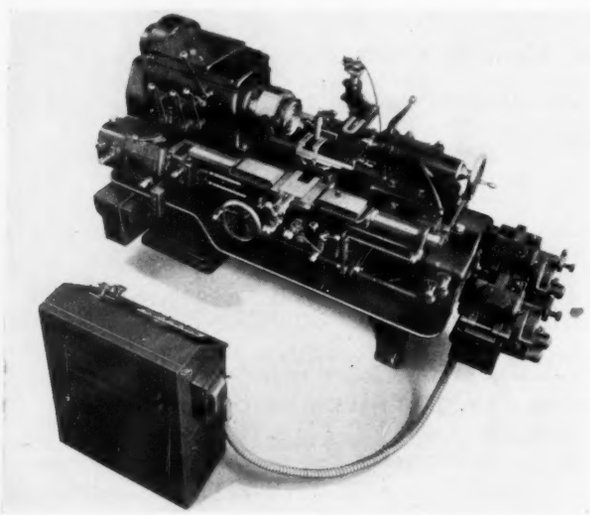
Frequent Reversal Possible with New Induction Motors

General Electric Co., Schenectady, N. Y., is announcing a new line of single-phase, repulsion induction motors, capable of frequent reversal. These motors have the same appearance as the general-purpose, single-phase motors of the company, and are mechanically interchangeable in all respects with corresponding horsepower and speed ratings of that type. Available ratings range from ¾ to 5 horsepower at 1800 revolutions per minute, and from ½ to 2 horsepower at 1200 revolutions per minute. The starting torque is high and ranges from 225 to 275 per cent of normal full-load running torque depending on the motor rating. The control for the new motor consists of a full-voltage; 3-pole, reversing switch which may be either manual or magnetic. Machine tools, garage equipment and automatic door openers are representative of some of the many things to which these new motors can be applied advantageously.

◆

Threading Attachment Has Full Electric Control

Goss & DeLeeuw Machine Co., New Britain, Conn., has developed an electrically operated threading attachment for use on its multiple-spindle automatic chucking machines. The accompanying illustration shows this device mounted on the tool head of one of these auto-



Complicated shapes are machined rapidly and accurately under influence of a tracer feeling along the edge of a templet and guiding the tool through electrical control

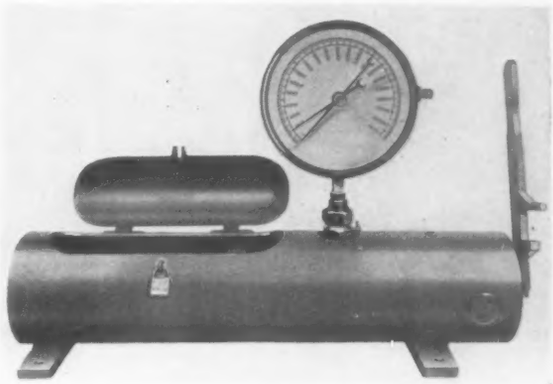
matics, the photograph having been taken at the tooling end of the machine looking in the direction of the headstock.

The attachment is driven by an independent reversing motor, which may be of the standard or high starting torque type either for alternating or direct current. This drives the threading spindle through a worm and worm wheel and a set of pickoff gears. Starting, reversing and stopping of the spindle are accomplished by the throwing of a specially designed switch, no clutches of any kind being employed, thereby avoiding a fruitful source of mechanical trouble and at the same time insuring precision of operation.

Operation Is Automatic

Operation is entirely automatic, the forward motion of the main slide of the machine acting to throw the switch into "forward" position, and the mechanism of the attachment itself throws the switch into "reverse" and "stop" positions. Regardless of line voltage, the switch operates on 110 volts, this being stepped down from the line by a transformer. Arcing of the switch is thereby avoided. The switch in turn operates a standard reversing control box carrying the full line voltage. A solenoid brake connected into the motor line automatically stops the attachment motor and threading spindle, and prevents coasting during the return cycle.

Among the advantages claimed for this mechanism by the maker are: Instantaneous reversing without shock at an exact predetermined point, permitting high spindle speeds, close to shoulder threading and bottoming of taps in blind holes; elimination of clutch troubles such as loss of adjustment and consequent slipping, with attending uncertainty of starting, stopping and reversing of the mechanism.



Qualification tests of welders' ability, as well as periodic tests of their work, can be made readily and economically by means of this pressure apparatus

Portable Machine Tests Strength of Welds

Oxweld Acetylene Co., New York, has developed a portable tensile testing machine designed to facilitate the testing of welds in the field or shop. This machine, shown in the accompanying illustration, was developed in co-operation with Union Carbide & Carbon Research Laboratories. It weighs 165 pounds and measures 28 inches in overall length and 6¾ inches in maximum diameter. It is a self-contained, totally-enclosed unit. When closed for shipment, there are no projections and the machine presents a comparatively smooth cylindrical surface.

Details of Apparatus

The machine consists of a tubular compression member with a set of grips in the head and a hydraulic cylinder block in its base. The cylinder block contains a communicating pump and cylinder directly machined into a single block. The cylinder pressure operates a piston carrying a second set of grips.

The specimen to be tested is placed between the jaws, which have spring grips; the release valve is closed; and pressure is applied by the hand pump. The load is measured directly in pounds per square inch on a suitable, calibrated pressure gage actuated by the pressure in the cylinder. The gage is one of the essential parts of the apparatus. When a test is finished, the pressure may be released by a valve and the piston may be returned to its original position by using the pump handle as a lever. A set of conical blocks has been constructed to fit into the machine head in place of the grips so that standard ½-inch diameter round specimens may be tested if desired.

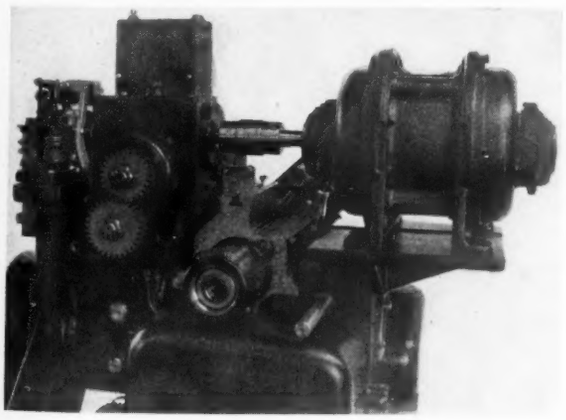
This machine makes it possible to secure a tensile test of a specimen immediately after welds are made. This is particularly important in connection with qualification tests for determining welders' ability. It also facilitates making periodic check tests of the operators and in many cases provides a ready means for testing sections cut at random by the inspector from completed work.

◆

Automatic Gear Generator Is Versatile Machine

Farrel-Birmingham Co. Inc., 344 Vulcan street, Buffalo, has put on the market a high-speed, full-automatic gear generator designed primarily for economical production of precision gears for the automotive industry. The machine has a diameter range from ¼ to 12 inches and will cut all pitches of parallel axis gears from 24 up to and including 4 diametral pitch. It will cut all kinds of spur gears, including helical and those having continuous herringbone teeth with sharp apices. Cutting is done at the rate of 850 strokes per minute.

Among the advantages claimed for this machine are: Ability to cut simultaneously two gears of a cluster combination, whether the pitches be the same or different; two cutters can be set so that one gear is cut in one direction and the other in



Advantage is taken of desirable characteristics of electrical control in this chucking machine threading attachment, which contains no clutches and which gives precise operation

In spite of its overall length of only 7 feet 10 inches, this handy portable crane has ability to lift 2000 pounds to height of 13 feet

the reverse direction, thereby eliminating idle time; grooved-center herringbone gears can be cut with different pitches on each side, these being known as the dual-pitch type; pinions with long shafts, combination gears of the cluster variety, and gears integral with crankshafts, can be cut, on account of ample distance from end of work spindle to arbor support; the machine also is adapted to splining shafts and to cutting cams and other irregular shapes.

Built for Precision

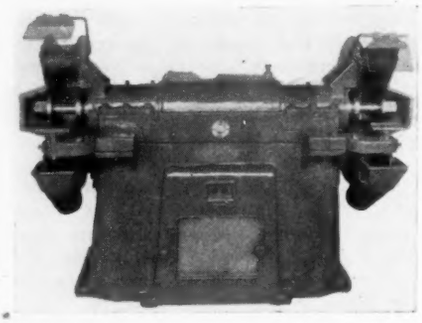
Rigidity is attained in the design by a heavy box frame, large diameter main spindle and substantial outer support for work arbor. All cutter settings and other ordinary adjustments are controlled by one handle located conveniently for the operator. Double grooved guides are used and the shoes are adjustable to eliminate backlash and to compensate for wear. Cutter spindles are case hardened, ground and lapped and run in bearings fitted in the same manner. Numerous case hardened and lapped bearings are used elsewhere in the machine. A new positive and silent relief mechanism is incorporated into the design. Floor space occupied by the new gear generator is 6 feet x 4 feet 7 inches, and shipping weight is about 7500 pounds.

◆

Combination Spindle Drive Aids Grinder Efficiency

Hammond Machinery Builders, Kalamazoo, Mich., has developed a new grinder which has a combination of herringbone gear and V-belt drive, giving high operating efficiency for all snagging and rough grinding work. The grinder, shown in the accompanying illustration, gives its wheels a constant peripheral speed of approximately 9000 feet per minute. While this speed is especially suited for bakelite and rubber bonded wheels, the machine can be arranged for use with vitrified grinding wheels.

Power is transmitted from a fully protected motor, accessibly mounted at the rear, to an intermediate drive shaft by means of multiple V-belts. Speeds are adjusted by means of quick change pulleys on the motor. The power from the intermediate spindle to the main spindle is transmitted by means of herringbone gears, running in an oil bath.



Combination V-belt and herringbone gear drive characterizes this grinder

Wheel guards are made of boiler plate, being designed in accordance with American Standards association recommendations. They are adjustable to compensate for the wear of the wheel and are fitted with shatterless glass eye shields. The spindles are made of chrome-nickel steel, ground, and accurately balanced. An automatic starter protects the motor from overload or low voltage phase failure. Wheels 16, 18, 20 and 24 inches in diameter can be used effectively.

◆

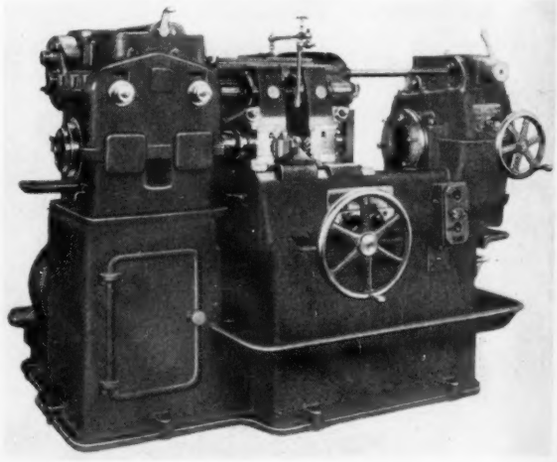
Ease of Operation Features Variable Height Crane

Clark Tructractor Co., Battle Creek, Mich., has developed a variable height crane which can negotiate plant and warehouse doors and narrow aisles with ease. The crane, shown in the accompanying illustration, has the capacity to lift 2000 pounds to 13 feet, and yet, when the boom is horizontal, the entire equipment has an overall length of but 7 feet 10 inches. The equipment has been used for placing heavy castings and forgings on drill presses, lathes, and other machine tools, and in handling heavy parts and machines in storage.

Standard Chassis Used

The chassis is a standard tractor, made by the company, and has a turning radius of 108 inches. Equipment includes self-starter, generator, battery, head and tail lights. The tractor-type gas engine uses 5 or 6 gallons of gas and a pint of oil daily, and is capable of 24 hours continuous operation. The maker points to practical tests which indicate that this crane will find continuous profit able use, either in the shops or around the yards, even in the case of plants of medium size.

Versatility, speed and precision mark this new horizontal gear cutting machine which produces all varieties of spur gears, including helical and herringbone, on the generating principle



Low Buying Handicaps Price Rise

Stabilization in Heavy Steel, However, Is Bettering Producers' Position—Operations Off—Semifinished Down $1—Pig Iron Sales Brisker

PRODUCERS of steel bars, plates and shapes, who recently announced an advance of $1 per ton for the first quarter, to 1.65c, Pittsburgh, are encountering the difficulties usually attending an effort to establish an advance in a buyers' market.

Lacking demand for their own products, consumers generally are indifferent to first quarter commitments, thereby denying the market a highly desirable positive force. Willingness of mills to accept 1.60c specifications to Dec. 31 for shipment at their convenience and hesitancy to cancel contract carryovers also are a drag.

A majority of consumers in territory tributary to Pittsburgh in price have taken no stand on first quarter contracts. Some have been offered coverage for the first quarter at 1.60c, a level originally intended only for preferred buyers. In the East, acceptance of bases equivalent to 1.65c, Pittsburgh, has been rather general, with heavier specifying against lower-priced contracts.

A spotty, untested price situation thus prevails in steel, especially in the Middle West. But should the movement to stabilize accomplish only a firming of the market to 1.60c, Pittsburgh, it will have been constructive and probably have proved a turning point. With shipments certain to be at a low ebb the next three weeks at least, the urgency of prices is not marked.

Sensitive to the usual seasonal trend, production and demand are variable and tending downward. Steelmaking operations this week are about 38 per cent, a drop of several points. Chicago, Birmingham and Youngstown mills average 40 per cent, Pittsburgh and eastern Pennsylvania 38, Cleveland 48 and Buffalo 24.

Tin plate production, however, has increased slightly, to 50 per cent, as mills start, as usual, to anticipate January requirements. Rail mills at Chicago, slowly accelerating, are at 40 to 50 per cent this week. In the Mahoning valley, due in large measure to Chevrolet specifications, some sheet mills are booked through December and may operate Christmas day. The trend, however, is for a marked diminution of production over the holidays.

Plates, shapes and bars are less active in all markets, with few contracts closed. Structural awards this week, at 35,377 tons, compare with 18,816 tons last week and 98,030 tons a year ago. Principal award this week was 9700 tons for a subway section in New York. Fresh inquiry totaled 20,000 tons.

Chevrolet releases for steel, including 15,000 tons of sheets, contrast with a reduction of Ford operations. An important Ford announcement, probably including a reduction in price, nears.

Western mills will benefit largely from the 30,000 tons of steel required for 1450 freight cars ordered by the Santa Fe. Great Northern has bought steel for repairing 1000 to 2000 cars. Rail orders include 20,000 tons by the Louisville & Nashville, 11,000 tons by the Wabash and 8000 to 9000 tons by the Kansas City Southern. Many carriers are inquiring for substantial requirements of steel and car accessories for the first half.

Municipal interest in cast iron pipe is greater, Milwaukee being in the market for 6000 tons and Detroit 11,000 tons. A large steel gas line in Canada is rumored.

Pig iron consumers supplied by Cleveland furnaces placed 28,000 tons this week, indicating confidence in current prices. Furnace coke is easier. Producers of scrap prefer to hold rather than sell at current low prices.

Increase of 157,873 tons or 4.5 per cent in the unfilled tonnage of the Steel corporation Nov. 30 is ascribed to formal entry of rail orders for 1931 rolling. The backlog of the corporation Nov. 30 was 3,639,636 tons; a year ago 4,125,345 tons.

Semifinished steel prices, while not formally announced for the first quarter, appear to be off $1 per ton, making sheet bars, billets and slabs $30 and wire rods $35. Manufacturers' wire is offered in instances at 2.20c, a reduction of $2.

Reflecting this adjustment, STEEL's market composite is down 16 cents, to $31.68.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (Dec. 17, 1930)	**$31.68**
Last week (Dec. 10, 1930)	**31.84**
One month ago (November, 1930)	**31.92**
Three months ago (September, 1930)	**32.65**
One year ago (December, 1929)	**35.95**
Ten years ago (December, 1920)	**54.04**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 17, 1930	Nov. 1930	Sept. 1930	Dec. 1929
PIG IRON				
Bessemer, del. Pittsburgh	$18.76	18.76	20.13	20.76
Basic, valley	17.00	17.00	17.75	18.50
Basic, eastern del. eastern Pa.	17.50	17.50	17.88	19.75
No. 2 foundry, del. Pittsburgh	18.26	18.26	19.13	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	20.00
*Southern No. 2, Birmingham	14.00	14.00	14.00	14.25
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del. Phila.	18.76	19.26	19.76	21.76
Malleable, valley	17.50	17.50	18.35	19.00
Malleable, Chicago	17.50	17.50	17.50	20.00
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	18.50	19.13
Ferromanganese, del. Pittsburgh	89.79	103.79	103.79	104.79
COKE				
Connellsville furnace, ovens	2.50	2.55	2.60	2.65
Connellsville foundry, ovens	3.50	3.50	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	31,00	31.00	34.00
Sheets bars, open-hearth, Pitts.	30.00	31.00	31.00	34.75
Billets, open-hearth, Pittsburgh	30.00	31.00	31.00	34.75
Wire rods, Pittsburgh	35.00	36.00	36.00	40.00

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $12 to $13, Birmingham. **2.25 to 2.75 silicon.

	Dec. 17, 1930	Nov. 1930	Sept. 1930	Dec. 1929
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.90
Steel bars, Chicago	1.70	1.70	1.70	2.00
Steel bars, Philadelphia	1.89	1.89	1.89	2.22
Iron bars, Chicago	1.70	1.70	1.75	2.00
Shapes, Pittsburgh	1.60	1.60	1.60	1.90
Shapes, Philadelphia	1.76	1.71	1.66	1.91
Shapes, Chicago	1.70	1.70	1.70	2.00
Tank plates, Pittsburgh	1.60	1.60	1.60	1.90
Tank plates, Philadelphia	1.80½	1.805	1.805	2.10
Tank plates, Chicago	1.70	1.70	1.70	2.00
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.10	2.15
Sheets, black, No. 24, Pitts.	2.35	2.35	2.40	2.75
Sheets, gal., No. 24, Pittsburgh	2.90	2.95	3.00	3.40
Sheets, black, No. 24, Chicago	2.50	2.45	2.60	2.90
Sheets, blue anl., No. 13, Chicago	2.30	2.30	2.30	2.50
Sheets, galvanized, No. 24, Chi.	3.15	3.15	3.25	3.60
Plain wire, Pittsburgh	2.20	2.30	2.30	2.40
Wire nails, Pittsburgh	1.90	1.90	2.00	2.40
Tin plate, per base box, Pitts.	5.00	5.00	5.25	5.35
SCRAP				
Heavy melting steel, Pitts.	12.75	13.10	15.70	15.10
Heavy melting steel, eastern Pa.	11.00	11.50	13.00	14.50
Heavy melting steel, Chicago	10.00	10.20	12.25	12.50
No. 1 wrought, eastern Pa.	13.50	13.50	14.25	15.25
No. 1 wrought, Chicago	10.00	10.00	11.25	13.25
Rails for rolling, Chicago	13.00	13.10	14.50	14.60

Sheets

Sellers Hold to New Prices—First Quarter Business More Active—Market Still Spotty

SHEET PRICES, PAGE 75

Pittsburgh — Sheet specifications and mill operations hold at their recent slow rates. First quarter contracting is more active, one producer reporting last week's business the heaviest of the year. No improvement in demand is looked for during the remainder of the year. Although some specifications have been received for January shipment, the pickup in business after Jan. 1 gives indications of being only slight. Prices are showing a fair degree of stability at current levels of 2.35c to 2.45c for black sheets, 2.90c to 3.00c for galvanized, 2.05c for blue annealed sheets and 1.90c for blue annealed plates. Autobody sheets continue in a dull market with the price 3.30c. Mill operations continue around 35 per cent.

New York—Galvanized sheets now appear generally established at 3.00c, Pittsburgh, for first quarter. Only in scattered instances does the 2.90c price apply. Black sheets are 2.35c, Pittsburgh; No. 10 blue annealed, 1.90c, and No. 15 blue annealed, 2.25c. Little contracting is noted.

Philadelphia—Sheet demand has improved slightly, due mainly to a desire of consumers to take advantage of old prices rather than to an increase in consumption. Galvanized sheets were sold in the past week at 2.90c to 3.00c, Pittsburgh, although mills now generally are firm at 3.00c for first quarter. The general minimum on black sheets is 2.35c. Blue annealed continue 1.90c for heavy gages and 2.05c for light. The extent to which seconds are being sold here to consumers who in the past have purchased primes is commented upon, as the percentage of seconds seems unduly large.

Youngstown, O.—Some sheet mills are down with little immediate prospect for resumption; others are at 35 per cent of capacity, still others at 75 per cent, while one sheetmaker is under pressure for automotive deliveries. Deliveries for this year are being made on autobody sheets at 3.40c, Pittsburgh, in important instances, but 3.30c appears to be the first quarter price. Common black also are being shipped from local mills up to 2.35c, but a few first quarter sales have been made at 2.30c. Galvanized still hold firmly in this district at 3.00c, probably aided by the new first quarter reaffirmation of that price by important makers. As to when the automotive consuming trade will enter the market for additional supplies of sheets still is a question.

Cleveland—Some electric refrigerator manufacturers are specifying more actively. Fisher Body Co. here divided orders for about 15,000 tons of sheets, chiefly full finished. Some material recently was released for Hudson and Austin cars. Jamestown, N. Y., metal furniture plants recently received approximately $500,000 worth of business in metal doors, interior trim and elevator enclosures for New York office buildings, and this is reflected in sheet releases. General inquiry is dull and contracting for first quarter is not really under way. Autobody seconds have been increased $5 to $7 a ton, 18 to 20-gage now quoted $45; 19-gage, $46; and 22-gage, $48. An Ohio mill refused an order for black sheets at 2.30c, Pittsburgh. This mill and others are holding to 2.35c. Despite reports of a 3.20c, Pittsburgh, quotation on full finished, makers selling here adhere to 3.30c, and quote 3.60c on metal furniture.

Chicago—Forward contracting for sheets is proceeding at a brisk rate. Specifications are dwindling and operations this week are on a 35 to 40 per cent basis. Operating losses sustained by western sheet mills in the last few months preclude further price easiness at this time, according to some producers. It is reported jobbers and other buyers now feel the bottom of the price decline has been reached. A range of 2.45c to 2.55c, Gary and Indiana Harbor, still prevails for No. 24 black, lower quoted only for exceptional tonnage.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
*Gary, Indiana Harbor	2.45c to 2.55c
*Chicago, delivered	2.50c to 2.60c
Birmingham, base	2.50c to 2.60c
St. Louis, del.	2.80½c

*Min. applies to large quantities.

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.65c to 2.75c
Gary, base	2.75c to 2.85c

GALVANIZED NO. 24

Pittsburgh, base	2.90c to 3.00c
Philadelphia, delivered	3.19c to 3.29c
Gary Indiana Harbor	3.10c
Chicago, delivered	3.15c
Birmingham, base	3.15c
St. Louis, del.	3.35½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.25c
Chicago, delivered	2.30c
St. Louis, delivered	2.50½c
Philadelphia, delivered	2.34c
Birmingham	2.20c to 2.25c

BLUE ANNEALED PLATES, NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.10c
Chicago, delivered	2.15c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.35½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.60c

Tin and Terne Plate

Prices per 100-pound box Pittsburgh

Tin plate, coke base	5.00

Gary, Ind., base 10 cents higher.

Long ternes, 24, assorted	3.55c
Long ternes, 24, unassorted	3.45c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.05c and 2.15c
Galvanized wire	2.50c and 2.60c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
**7/16-inch and smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, del.	1.88c to 1.93c
Boston, del.	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.10c to 2.20c
St. Louis, del.	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.75½c to 1.85½c
Boston, del.	1.88½c to 1.98½c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleve. base, local del.	1.65c
Do, outside delivery	1.65c
Philadelphia, del.	1.89c to 1.94c
New York, delivered	1.93c to 1.98c
Boston, delivered	2.00c to 2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.65c
Eastern mills	1.65c

IRON

Chicago, base	1.70c to 1.75c
New York, delivered	2.08c
Philadelphia, delivered	1.89c to 1.94c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi. billet	1.70c to 1.80c
Chi., rail steel	1.50c to 1.60c
Philadelphia, cut lengths	1.99c to 2.04c

Cold-Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.00c to 2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets, 35c; plates 31c; bars 28c

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni	1.05
2100	0.55	5100 .80-1.10 Cr.	0.45
2300	1.50	5100 Chr. spring	0.20
2500	2.25	6100 bars	1.20
3100	0.55	6100 Spring	0.95
3200	1.35	Chr., Ni., Van.	1.50
3300	3.80	Carbon Van.	0.95
3400	3.20	9250 (flats)	0.25
4100 .15 to .25 Mo.	0.50	9250 (rds., sq.)	0.50
4600.20	30 mo.		

Strip, Hoops, Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.80c
Do. 6 1/16 to 24 in.	1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.80c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off

Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off

Upset 1 in. and smaller ..... 80-10-5 off

Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., mills	2.45c
Do, less carloads	2.55c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	2.00c

Bars

Specifications Gain as Year Nears End—First Quarter Buying Shows Little Spirit

BAR PRICES, PAGE 75

Chicago—Bar mill operations, at 40 to 50 per cent, are lower, but the added volume of specifications reached in November is little changed. News from the implement group indicates slight gains for tractors and continued uncertainty for tillage and harvester tool products. Reports are that implement works are looking ahead to a power equipment sales program for five years that should surpass the last five years of activity. Road machinery builders are working on programs for Texas, Louisiana and Missouri, which appear promising. It is indicated there will be considerable carryover of 1.70c soft steel bar, plate and shape tonnage into first quarter. Bar iron has advanced to 1.75c, Chicago, for first quarter, in line with soft steel bars. The previous 1.70c price will prevail against shipments authorized before Jan. 1.

New York—While there is little general contracting for first quarter, demand for steel bars is somewhat more active, with consumers rounding out their contracts for the current quarter. Most sellers are quoting 1.65c, Pittsburgh, on new spot business, although extending 1.60c to the more highly preferred customers for first quarter.

Philadelphia — Specifications for steel bars show some improvement because of the discontinuance of some lower prices at the year's end. The curent market is 1.60c to 1.65c, Pittsburgh.

Pittsburgh — First quarter bar contracting continues slow. Some quickening in specifications against old contracts had been looked for as the result of the $1 increase to 1.65c, Pittsburgh, for first quarter but incoming tonnage is no more than holding its own. The market continues 1.60c on shipments over the remainder of the month with producers asking $1 more for first quarter.

Youngstown, O.—Some first quarter bar business is being booked here at 1.65c, Pittsburgh, but the volume appears small. If buyers can specify definite tonnages to end of the year at 1.60c they are being allowed to do so in some instances. Whether this may result in a carryover into first quarter remains a question.

Cleveland—Local mills continue with quotations of 1.65c, Cleveland, for both local and outside delivery for current and first quarter. Specifications have shown improvement, with one of the leading sellers in this district. Reluctance of some customers has been met to sign contracts at a 1.65c, Cleveland, base, for first quarter, 1.60c being more common on commitments. Inroads are reported by distant mills naming a 1.65c, Cleveland, or 1.60c, Pittsburgh, whichever applies to the buyer's advantage.

Cold-Finished Bar Shipments Are Slack

Cold Finished Prices, Page 75

Pittsburgh — Shipments of cold-finished steel bars so far this month hardly are equaling the rate of the corresponding November period. Announcement of the first-quarter price is expected to be made this week. The

Cleveland—Ordering for first quarter goes ahead at a slow pace with only a few contracts being placed. The current 2.00c to 2.10c price lacks confirmation for that period though the trade expects continuation of the present price. December releases have tapered to a low for any month this year. Producer operations are 25 to 35 per cent capacity.

Plates

Buyers Specifying More Freely at Old Price—New Quotation Is Not Being Fully Tested

PLATE PRICES, PAGE 75

New York—Plates are 1.70c to 1.75c, Coatesville, Pa., with the lower price for preferred customers. Some of the large users continue to cover for first quarter. Not all makers have definitely opened books for first quarter, although expected to do so this week. General demand continues to gain slightly. Except for the Lehigh Valley and one or two others, all railroads in this district have specifications out for next year. The New York Central will open bids Dec. 29 on plate requirements for the entire first half. Fabricated plate work remains negligible. The local department of water supply, gas and electricity is expected in the market this week for 6200 tons of 48-inch steel pipe.

Philadelphia—Plate demand is larger and the feeling among mill interests has improved because of a firmer price situation. Old special prices are being abandoned, which accounts for an increase in specifications. The current market for new business is 1.70c to 1.75c, base, Coatesville, Pa., the latter figure being obtained for small tonnages. About 4300 tons of plates are involved in locomotive inquiries, including 57 for the St. Paul and 50 for New York Central. A fair size tonnage is in prospect for smaller inquiries.

Pittsburgh — Plate business is light and little change in tonnage is noted since the first of the month. The inquiry of the Inland Waterways Corp. for 50 barges represents the most active item in the plate market. Recent awards of floating equipment involve about 800 tons. First quarter contracting is fairly active, with producers quoting 1.65c. The market continues 1.60c on tonnage shipped over the remainder of December.

Cleveland—Plate inquiry is practically absent. Interest in first quarter is manifest only in contract takers getting in at 1.60c, Pittsburgh. The 1.65c price named for that period has had a firming effect on 1.60c. Consumers currently specify quick delivery. Plate fabrication business is slow. Several tank tops in lake repair work have been let. The 5000-ton lake freighter still is pending, probably until after the first of the year.

Chicago—Plate shipments to Milwaukee for pipe line work are tapering and mill operations are variable at around 50 per cent. Skelp shipments to Milwaukee this month will total 20,000 to 25,000 tons. A fair portion of the 25,000 tons of plates and light shapes for barges on which the Inland Waterways Corp. is taking bids are expected to be let to western mills. A local tank fabricator has booked 8500 tons for two Oklahoma refinery storage projects. Contract sales which gained a week ago have subsided. Little business has been placed at 1.75c.

Contracts Placed

500 tons, wharf boat for Peoria, Ill., to Howard Ship Yard & Dock Co., Jeffer-

sonville, Ind.
275 tons, three barges for Muskingum River Gravel Co.; one barge for Parsons & Rader, Zanesville, O., to Jones & Laughlin Steel Corp., Pittsburgh.

Contracts Pending

6200 tons, 48-inch steel pipe for department of water supply, gas and electricity, New York, specifications expected out this week.
1000 tons, riveted steel pipe for Guatemala.
243 tons, tanks for United States Bureau of Reclamation, Boulder City, Nev.; bids opened.

Semifinished Market Slow; Sheet Bar Prices Softer

Semifinished Prices, Page 86

Pittsburgh — Interest in future semifinished tonnage is almost entirely lacking. Producers continue a nominal quotation of $31 for rerolling billets, slabs and sheet bars but a $30 price is heard on some new tonnage. A few contracts for forging billets have been signed at $36, with wire rods $35. Specifications remain the slowest of the year, low consumption combined with the desire to hold down stocks restricting shipments.

Philadelphia—Some first quarter billet contracts have been booked here at $31, base, Pittsburgh, for standard rerollers, and $36 for forging quality.

Youngstown, O. — While billets and sheet bars appear to have settled around $30, Pittsburgh and Cleveland, with certain mills in each of those districts, makers in this district have not followed as yet with any announcement of a cut of $1 a ton. Local makers, however, probably will quote $30, Youngstown. Wire rods are now being sold for first quarter on the new basis of $35, Cleveland and Pittsburgh, a reduction of $1 a ton.

Cleveland—The leading merchant producer of sheet bars, billets and slabs has not yet named prices for first quarter, and continues to ship material on contract at $31, base, Cleveland and Youngstown, O. However, it is understood consumers have quotations of $30 on sheet bars, and in some instances prices which figure back to less than $30, Cleveland. Makers and users are negotiating. The Cleveland producer continues to operate six of its 14 open hearths.

Chicago—Semifinished steel sales are light. Nominal quotations of $32 for small rerolling billets and sheet bars are named in line with the $31, Pittsburgh-Cleveland quotations. Forging billets are quoted at $37. A range of $36 to $37 now is named for wire rods.

Railroads

Santa Fe Buys 1524 Cars—Live Inquiries Total About 1000—45,000 Tons Rails Let

TRACK MATERIAL PRICES, PAGE 75

New York—Eastern railroads are placing few cars but action by the New York Central is expected momentarily on 50 locomotives. Active inquiry for freight cars totals 1000. Central Railroad of New Jersey is expected to place its 1931 rail requirements this week. With few exceptions, eastern railroads have entered the market for plates, shapes and bars for first quarter, New York Central's inquiry being for first half, bids to be opened Dec. 29. Delaware, Lackawanna & Western also opens bids Dec. 29 on first half steel needs including 1000 tons of wrought steel pipe, 20,000 locomotive boiler tubes, 1500 solid steel wheels for cars and locomotives and a number of axles for freight and passenger cars and locomotives. Pittsburgh & Lake Erie opens bids Dec. 29 on first half requirements of axles and tubes.

Worcester, Mass.—Osgood Bradley Car Co., subsidiary of Pullman Co., received a $750,000 contract from Brooklyn & Queens Corp., New York, for 50 trolley cars. Shops will be operated full time until April.

Philadelphia—Pennsylvania's rail inquiry, which may amount only to 150,000 tons this year, is expected out this week.

Pittsburgh—New York Central railroad's first half requirements include sheets, bars, shapes, plates, pipe, etc. Inquiry from this road for spikes and tie plates to accompany its rail tonnage is looked for shortly. Baltimore & Ohio railroad is inquiring for 7500 kegs of spikes. Inquiries for cars continue poor. Specifications from railroads so far this month are fairly steady. Light rails are quiet, with the market continuing $34.

Chicago—Wabash placed 11,000 tons and Kansas City Southern 8000 to 9000 tons of rails. A few miscellaneous lots have brought the total to 25,000 tons. Track accessory specifications disappoint. Rail mill output now is 40 to 50 per cent, a gain of about 10 per cent in the last 10 days.

Great Northern will build and repair 1000 to 2000 miscellaneous freight cars in its own shops, steel already having been ordered. About 18,000 to 20,000 tons of finished steel will be required for the 1500 freight cars and 22 cabooses ordered by Santa Fe, but specification schedules will not be in until early in January. Most of this steel will go to local producers. Santa Fe also is expected to order some gas-electric cars. Reports are that estimates are being asked for about 500 to 600 freight cars to appear in inquiries shortly.

Birmingham, Ala.—Orders for rails and accessories are commencing to be accumulated and plants are expected to resume shortly after Jan. 1. Local street railway system is taking some rail tonnage off mill yards.

Car Orders Placed

Atchison, Topeka & Santa Fe, 1500 freight, 2 cafe lounge cars and 22 cabooses; 350 50-ton box, each to Pressed Steel Car Co., Pittsburgh, and General American Tank Car Corp., Chicago, and 300 50-ton box and 22 cabooses, to American Car & Foundry Co., New York, and 500 refrigerator and two cafe lounge cars to Pullman Car & Mfg. Corp., Chicago.
Brooklyn & Queens Corp., New York, 50 trolley cars, to Osgood Bradley Car Co., Worcester, Mass., subsidiary of Pullman Co., and 50 to J. G. Brill Co., Philadelphia.
Carnegie Steel Co., Pittsburgh, 15 special 70-ton flat cars to Standard Steel Car Co., Pittsburgh; 20 70-ton flat cars to Pressed Steel Car Co., Pittsburgh; these 20 were reported last week as going to another builder.
Chicago, one hopper, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

Rail Orders Placed

Kansas City Southern, 8000 to 9000 tons of rails, divided between Illinois Steel Co., Chicago, and Bethlehem Steel Co., Bethlehem, Pa.
Louisville & Nashville, 20,000 tons of rails, to Illinois Steel Co., Chicago.
Wabash, 11,000 tons of rails to unstated mills.

Car Orders Pending

Fruit Growers Express, 20 underframes.
Great Northern plans to build or rebuild 2000 freight cars in its own shops during 1931.
Seaboard By-Products Coke Co., repairs for 248 hopper cars, not new cars as previously listed.

Suspends Wheel, Rail Rate

Washington—Interstate commerce commission has suspended until July 10, 1931, operation of railroad schedules which propose to cancel the present commodity rates on old rails and old car wheels in carloads, when used for other than remelting purposes, from, to, and between points in southwestern territory, which would result in the application of higher class rates.

Structural Shapes

Engineering Work Leads Construction Activity—15,000 Tons, Subways Let—Firmer Price Trend Stimulates Some Closing—Fresh Inquiry Above 20,000 Tons

STRUCTURAL SHAPE PRICES, PAGE 75

New York—Structural steel prices, both plain and fabricated material are firmer with 1.885c, New York, more in evidence. On new business even higher than this is reported done. A 5300-ton subway section went to American Bridge Co., the section on which readvised bids were taken late in November. Outside of engineering work, lettings and inquiry have slumped. Three apartment houses are on the active list. Some large city jobs are up. An office building near Bryant Park will take 1200 tons. Early action is also expected on the Earl Carroll theater in which the general contract has been placed.

Boston — The Professional Arts building, this city, taking 2300 tons,, was awarded to New England Structural Co. A state highway bridge at Revere, Mass., 138 tons, is pending.

Philadelphia — Shape demand shows some increase due to the withdrawal of old prices with the year end and the current market on new business in plain standard shapes 1.70c to 1.75c, base, eastern mills. Shape producers feel more cheerful over the future because of an unusually large number of projects being figured or talked about.

Pittsburgh—Activity in structural steel continues to moderate, specifications being off slightly since the first of the month and awards and inquiry being seasonally quiet. Plain material continues 1.60c to 1.65c, Pittsburgh. A local fabricator booked 2000 tons for a West Virginia state bridge.

Cleveland—Outside of a fair number of small less-carload jobs, active inquiry is confined to a James Ford Rhodes high school, bids on which closed Dec. 15, 490 tons. The federal job at Toledo, O., and a postoffice at Albuquerque, N. Mex., went to Massillon Bridge & Structural division of Fort Pitt Bridge Works Co., through N. P. Severin Co., Chicago, general contractor, 415 and 100 tons respectively. A department of justice building at Chillicothe, O., went to Burger Iron Co., Akron, O. Fabricators are counting on $23,000,000 worth of New York Central grade separation work in western New York and a $39,000,000 road building program for Ohio for early 1931 award.

Expenditures of $4,075,000 for post offices at Barberton, Bucyrus, Canton, Napoleon, Springfield and Youngstown, O., have been approved but the federal architects have not decided as yet whether concrete or structural buildings will be erected.

Cincinnati — Bids have been opened but awards delayed on a 2400-ton bridge at Mt. Carmel, Ill., a joint Illinois and Indiana highway project. Vincennes Bridge Co., Vincennes, Ind., was the indicated low bidder at $399,413.

Chicago—Structural mill operations are below 50 per cent. It is indicated production will be down for at least a week during the holiday period. Bids are in on the general contract for the 33-story club and office building for Motors Association of Illinois, Chicago, 4000 tons. A number of small inquiries are out. Few buyers are contracting for first quarter on the 1.75c basis.

Birmingham, Ala.—New business in structural material is in small lots. Bids however, are going in on the 4100-ton capitol building at New Orleans. Ingalls Iron Works Co. was awarded 1600 tons for two underpasses for a grade elimination here. One fabricator expects to shut down for one day only at Christmas.

Contracts Placed

9700 tons, subway, route 108, section 9, Queens, N. Y., to American Bridge Co., Pittsburgh; Arthur A. Johnson Corp., general contractor.

5300 tons, subway, route 107, section 8, Lafayette street, Brooklyn, N. Y., to American Bridge Co., Pittsburgh; Cornell Contracting Corp., general contractor, readvertised contract on which bids closed Nov. 25.

4500 tons, apartments, 330-60 West Fifty-seventh street and two 11-story sections, 333-67 West Fifty-sixth street, New York, to Levering & Garrigues Co., New Market, N. J.; Henry Mandel interests, builders.

2300 tons, Professional Arts building, Boston, to New England Structural Co., Boston; H. K. Ferguson Co, Cleveland, general contractor.

2000 tons, state bridge over Kanawha river, Point Pleasant, W. Va., to Independent Bridge Co., Pittsburgh.

1600 tons, two underpasses, grade elimination, Birmingham, Ala., to Ingalls Iron Works Co., Birmingham.

1050 tons, bridge, Harway avenue, over Coney Island creek, Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; W. H. Gahagan Inc., general contractor.

1000 tons, public school No. 76, Adee avenue, Bronx, N. Y., to Easton Structural Steel Co., Easton, Pa.; Agostini Bros., general contractors; reported last week as 500 tons.

1000 tons, apartment, West Ninety-sixth street, New York, to unstated fabricator.

750 tons, theater, Wilshire boulevard and Western avenue, Los Angeles, to Consolidated Steel Corp., Los Angeles.

700 tons, plant in West Virginia for Electro-Metallurgical Sales Corp., New York, to American Bridge Co.

600 tons, repairs to Bronx approach to McCombs dam bridge over Harlem river, New York, to American Bridge Co., Pittsburgh; Eastern Construction Co., general contractor.

500 tons, public school No. 24. Holy avenue from Union street and Robinson streets, Flushing, Queens, N. Y., to Easton Structural Steel Co., Easton, Pa.; Raymore Construction Co., general contractor.

450 tons, building, National Transit, Pump & Machine Co., Oil City, Pa., to Rogers Structural Steel Co., Corry, Pa.

425 tons, 12-story apartment, East Fortieth street, New York, to Fassler Iron Works, New York.

415 tons, postoffice, Toledo, O., to Massillon Bridge & Structural Co., Massillon, O., division, Fort Pitt Bridge Works Co., Pittsburgh; N. P. Severin Co., Chicago, general contractor.

400 tons, highway bridges, Massachusetts, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, state highway bridge, Frederick, Md., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

300 tons, O street viaduct, Chicago, Burlington & Quincy railroad at Lincoln, Nebr., to Vierling Steel Works, Chicago.

284 tons, repairs and alterations to Eleventh street viaduct, Omaha, Nebr., to Paxton & Vierling Iron Works, Omaha.

273 tons, highway bridge, Alegan county, Mich., to Massillon Bridge & Structural Co., Massillon, O., division, Fort Pitt Bridge Works Co., Pittsburgh.

260 tons, First street bridge, Grand Trunk railroad, Royal Oak, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, buildings at Algoa, Mo., Missouri State Prison board, to La Salle Iron Works, St. Louis.

250 tons, five bridges, Shamokin, Pa., division, Reading railroad, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, grade crossing elimination work, Utica and Harmon, N. Y., New York Central railroad, to Phoenix

Awards Compared

	Tons
Awards this week	**37,007**
Awards last week	**18,816**
Awards two weeks ago	**27,370**
Awards this week in 1929	**98,030**
Av. weekly awards, 1930	**35,227**
Av. weekly awards, 1929	**42,213**
Av. weekly awards, Nov	**33,202**
Tot. awards to date, 1929	**2,137,978**
Tot. awards to date, 1930	**1,796,580**

Bridge Co.; Walsh Construction Co., Syracuse, N. Y., general contractor.
200 tons, building, department of justice, Chillicothe, O., to Burger Iron Co., Akron, O.
200 tons, state highway bridges, Louisiana, to Lakeside Bridge & Steel Co., Milwaukee; in addition to 1300 tons to Vincennes Bridge Co., Vincennes, Ind., noted last week.
180 tons, apartment, Fifteenth avenue between Fifty-first and Fifty-second streets, Queens, N. Y., to Stanley Iron Works, Brooklyn.
150 tons, apartment, East Seventeenth street, Brooklyn, N. Y., to Gaynor & Rosenblum, Brooklyn.
150 tons, 6-story apartment, east side of Seventy-second street, Jackson Heights, Queens, N. Y., to J. Klein Inc., Iron Works, Astoria, N. Y.
130 tons, Panama Canal zone award, Washington, to Bethlehem Fabricators Inc., Bethlehem, Pa.
120 tons, 6-story apartment, 2246 Ocean avenue, Brooklyn, N. Y., to G & M Iron Works, Brooklyn.
110 tons, 6-story apartment, Ocean avenue and Voorhes street, Brooklyn, N. Y., to City Iron Works, Brooklyn.
105 tons, ferry terminal, Astoria, Queens, N. Y., to J. Edward Ogden Co., New York.
105 tons, post office, Pawtucket, R. I., to Altman Iron Works, New York.
100 tons, 6-story apartment, East Thirty-seventh street at Church avenue, Brooklyn, to Gold Seal Iron Works, Brooklyn.
100 tons or more, 5-story hospital addition, Secaucus, N. J., to Oltmer Iron Works, Hoboken, N. J.
100 tons, postoffice, Albuquerque, N. Mex., to Massillon Bridge & Structral division, Fort Pitt Bridge Works Co., Pittsburgh; N. P. Severin Co., Chicago, general contractor.
100 tons, fabricating plant and warehouse, Pioneer Sand & Gravel Co., Seattle to Hofius Steel & Equipment Co., Seattle.
100 tons, school addition, Pasadena, Calif., to Minneapolis Moline Power & Implement Co., Minneapolis.
100 tons, restaurant, West 181st street, Bronx, N. Y., to George A. Just Co., Long Island City, N. Y.
100 tons or more, apartments, Society of Phipps Houses, Queens, N. Y., to J. Klein Iron Works, Queens, N. Y.
100 tons, Georgia state highway bridges, to Ingalls Iron Works Co., Birmingham, Ala.
100 tons, factory, Hoboken, N. J., to Oltmer Iron Works, Jersey City, N. J.

Contracts Pending

7500 tons, building, Philadelphia Savings bank, Philadelphia; general contract to George A. Fuller Co., New York.
4000 tons, club and office building for Motors Association of Illinois, Michigan avenue and Twenty-fourth street, Chicago.
2400 tons, Illinois-Indiana highway bridge, Mt. Carmel, Ill.; Vincennes Bridge Co., Vincennes, Ind., low; award delayed.
2200 tons, Roosevelt hotel, Wichita, Kans.
1300 tons, auditorium, Pasadena, Calif.; bids Dec. 22.
1200 tons, office building, Sixth avenue and Forty-fourth street, New York.
1100 tons, Bronx continuation school, East 151st street, near Courtland avenue, Bronx, N. Y.; bids in.
1000 tons, superstructure for Star-Chronicle building, St. Louis.
1000 tons, bridge span for Northern Pacific railroad.
1000 tons, apartment, West Ninety-sixth street, New York; taking bids.
700 tons, Verdi school, Chicago; Wendnagel & Co., Chicago, low.
700 tons, highway bridges at Rockford, Ky.
600 tons, post office and federal building, Oklahoma City, Okla.
500 tons, Fidelity Bank building, Baltimore; revised.
500 tons or more, $700,000 gymnasium, Rutgers university; general contract to Highland Park Building Co., New Brunswick, N. J.
490 tons, James Ford Rhodes junior high school, Cleveland; bids in Dec. 15; John Grant & Son low on general contract.
400 tons, army medical school, Washington.
375 tons, New Jersey approach, Hudson river bridge, Port of New York Authority; bids close Jan. 5.
365 tons, bridge over Russian river, Santa Rosa, Calif.; bids Dec. 23.
350 tons, Fidelity building, Wilmington, Del.; general contract to Fisher-Williams Co., New York.
300 tons, state highway bridge, Mercer county, N. J.
300 tons, Bush & Bull store, Easton, Pa.
275 tons, bridges and approaches, route 8, section 6, New Jersey, bids Dec. 22.
225 tons, subway for Southern Pacific Co., San Jose, Calif.; bids Dec. 22.
225 tons, state highway bridge, Blairstown, N. J.
200 tons, addition, public school No. 63, Woodhaven, Queens, N. Y.; bids Dec. 22.
170 tons, state highway bridge Musconetcong, N. J.
130 tons, state highway bridge, Revere, Mass.
125 tons, bascule bridge, Stone Harbor, N. J.; also 250 tons of sheet piling.
125 tons, state highway bridge, Newark, N. J.

Concrete Bars

Inquiry Fair at Chicago and New York—1100-Ton Prison Job Up in East—2400-Ton Bridge Pends at Cleveland — 600-Ton Subway Tops Lettings

REINFORCING BAR PRICES, PAGE 75

New York—Concrete reinforcing bar prices are firm with 2.35c prevailing for cut stock out of local warehouse and 1.90c to 2.00c, Pittsburgh, for cut length billets on large tonnages to the job. Firmer stand by mills has steadied the market here. Awards are light but a 600-ton subway station was let. Pending engineering work calls for several thousand tons. About 450 tons are included in new work in Westchester county and 500 tons are up for the New Jersey approach to the Hudson river bridge. Attica prison will take 1100 tons.

Philadelphia—Concrete bars seem somewhat firmer, the usual prices on cut lengths, mill shipments in carloads, being 1.70c to 1.75c, Pittsburgh.

Pittsburgh—Reinforcing bar inquiries and awards are declining seasonally. Incoming tonnage to mills is holding well and for some interests is larger than a month ago.

Buffalo—Quiet rules in reinforcing bars. No large tonnages are up for early award. Mill operations are at the low point of the year.

Cleveland — Work in connection with Central-Lorain bridge, here, will require 2400 tons of reinforcing steel, about 1200 tons of concrete bars and 1200 tons in fabricated units. John Grant & Son, Cleveland, were low on the general contract for James Ford Rhodes high school, Cleveland, taking about 200 tons of bars. Billet bars are 1.60c to 1.65c, Cleveland.

Chicago—Several fair sized reinforcing bar inquiries are out. Awards remain light. Billet bars are quoted 1.70c to 1.80c, and rail steel, 1.50c, to 1.60c. Illinois highway department let 205 tons for a bridge over the Wabash river at Mt. Carmel, Ill. The club and office building for the Motors Association of Illinois, here, will use aout 400 tons.

Birmingham, Ala.—Concrete bar sales are in small lots. Producers are bidding on 1100 tons for the capitol building for Louisiana, including also 4100 tons of structural shapes. Mills will lose but little time late this month and will start 1931 with a fair backlog.

Awards Compared

	Tons
Awards this week	**2,915**
Awards last week	**4,350**
Awards two weeks ago	**5,140**
Awards this week in 1929	**3,457**
Av. weekly awards, 1929	**5,849**
Av. weekly awards, 1930	**7,062**
Average weekly awards, Nov.	**8,752**
Total awards to date, 1929	**301,421**
Total awards to date, 1930	**360,137**

Contracts Placed

600 tons, subway, route 108, section 9, Queens, N. Y., to Igoe Bros., Newark, N. J.; Arthur A. Johnson Corp., general contractor.
500 tons, warehouse and superstructure, plant addition, American Can Co., Seattle, to Northwest Steel Rolling Mills, Seattle.
350 tons, Paramount theater, Oakland, Calif., to Soule Steel Co., San Fran-

(*Concluded on Page* 83)

Strip

Light Shipments About Equal to Those of November—Prices Are Unchanged in Dull Market

STRIP PRICES, PAGE 75

Pittsburgh — Shipments of steel strip continue light but compare favorably with those of November, and for some interests are heavier than a month ago. First quarter contracting is slow with the market steady at 1.55c and 1.65c as minimums for hot strip and 1.60c and 1.70c figuring on some tonnages. Cold-rolled strip continues 2.25c to 2.35c. Automotive demand is sustained by activity in new models but tonnage is seasonally light. Strip mill operations hold around 30 per cent for hot mills with cold mills at 20 to 25 per cent.

New York—Cold-rolled strip is 2.25c, Pittsburgh, and hot strip 1.55c, Pittsburgh, for wide and 1.65c for the narrow. These prices, which apply to first quarter as well as to current needs, are receiving little test, however.

Youngstown, O.—Makers of narrow strip, especially hot-rolled, manage to gather in sufficient specifications to keep up a fair rate of operations. Some are operating 45 per cent, others up to 60 per cent of capacity. Wide strip does not appear in such promising demand, with auto parts makers once more giving sheetmakers a look-in. Prices apparently remain stationary for both hot and cold-rolled strip.

Cleveland—Strip steel specifications still are scarce, especially cold-rolled. A few automotive orders recently were distributed by Fisher Body Co. and other nearby parts makers. Several electrical clock manufacturers have been purchasing fair sized tonnages in recent weeks and miscellaneous users have bought as needed for operations at 25 to 50 per cent. Prices of 2.25c to 2.35c, Cleveland, have been named for first quarter on cold strip. Hot is quoted 1.55c, Pittsburgh, for wide and 1.65c, Pittsburgh, for narrow.

Philadelphia—Strip is dull and little interest is being taken. Hot-rolled strip is quoted at 1.55c for 6 to 24 inches wide and 1.65c up to 6 inches. Cold-rolled strip is 2.25c to 2.35c, Pittsburgh.

Warehouse Sales Moderate; Declines Fairly General

Warehouse Prices, Page 97

New York—Effective Dec. 15, jobbers announce new width extras on black sheets in line with action taken by the mills last month. As extras apply chiefly to the greater widths, the general run in this product from stock will be little affected. Demand generally is quiet, with little improvement expected until after inventory season.

Philadelphia—Jobbers are somewhat encouraged, particularly cold-rolled warehousemen who report business so far in December shows considerable improvement over the same part of November.

Buffalo—Sales of iron and steel show the usual preholiday slump. Dealers are preparing for inventories of their stocks and anticipate the usual dull two weeks in trade.

Pittsburgh—Activity continues to moderate. Orders are reduced both in number and in size since a month ago. Prices are unchanged.

Detroit—Orders continue numerically comparable to November but lighter in tonnage aggregate. Many plants are closed for inventory. Prices remain unchanged.

Cleveland—Demand shows no improvement over the light volume of November. The temporary upturn occasioned by the recent announcement of advanced mill prices on bars, shapes and plates for first quarter delivery has receded and activity again is at a minimum. No reports are heard here concerning adjustment of width extras on black sheets to conform with action recently taken by eastern warehouse interests.

Cincinnati — Rate of warehouse business so far has kept pace with November to form a disappointing fourth quarter. Prices continue steady.

Chicago—Warehouse market is in the throes of inventory retrenchments and buying is below normal. Sheet jobbing has subsided. Prices for shipment into Milwaukee territory show more stability.

St. Louis—Business of warehousemen since Dec. 1 represents the smallest total for any similar period this year. Aside for seasonal materials, the outward movement is unusually small. Requirements of the general manufacturing trade continue in insignificant proportions. Prices are quotably unchanged.

Operations Slipping at Chicago and the Valley

Youngstown, O.—Steel operations have declined to 40 per cent capacity, compared with 43 per cent last week. Reductions in schedules of Sheet & Tube and Republic account for the slump in the average. Other developments are suspension of operations at Empire Steel Corp.'s Falcon plant and a slight increase in sheet and strip schedules for Sharon Steel Hoop Co. The most favorable development is an upturn in tin plate schedules, following sharp improvement in inquiries by leading can makers. Republic and Sheet & Tube both cut operations five points to 35 per cent of capacity, against 40 last week. Carnegie Steel operations are unchanged at 50 per cent while Newton Steel Co. again reports production at 50 per cent of capacity at the Newton Falls plant. Mahoning Valley Steel Co.'s sheet plant is at 75 per cent, off slightly from last week. Fabricators report schedules from 50 to 70 per cent, with holidays likely to reduce such operations.

Philadelphia—Ingot rate in eastern mills continues unchanged at 35 to 40 per cent. Most mills will be shut down next week. Finishing capacity operates at 40 to 60 per cent as a result of requests for customers to send in specifications before the first of the year.

Buffalo—Steelworks continued at 24 per cent of open-hearth capacity. Four of 15 finishing mills were operated on part-time schedules in one plant with others having output in proportion.

Pittsburgh—Ingot production continues slightly above 35 per cent. Tin plate production is higher for the third consecutive week at 50 per cent with sheets continuing 35. Strip and pipe are unchanged at 30 and 35, respectively.

Cleveland—Operations at 48 per cent rated open-hearth capacity continue unchanged for the second week with 16 of 34 pouring. Corrigan, McKinney with six of 14 runs at virtually 50 per cent; Otis Steel Co. maintains an average of six this week at River works.

Chicago—Gain in rail mill operations is offset by variable activity of other finishing mills. Ingot output is at 40 per cent compared with 46 last week. Of the 36 steelworks blast furnaces, 14 now are on.

Birmingham, Ala.—With exception of the last ten days of the month steel mill operations will be unchanged at 40 to 43 per cent capacity. Ingot production is being maintained with nine open-hearth furnaces in operation.

Concrete Awards

(*Concluded from Page 79*)

cisco.

300 tons, theater and store, Monroe, Wis., to American System of Reinforcing, Chicago.

210 tons, foundation, municipal building, Center, Worth, Lafayette and Leonard streets, New York, to McClintic-Marshall Co., Pittsburgh; E. O. Roberts Co. Inc., general contractor.

205 tons, bridge over Wabash river at Mt. Carmel, Ill., to unstated fabricator.

190 tons, John Marshall high school, Cleveland, to McClintic-Marshall Co.; Crowell & Little Construction Co., Cleveland, general contractor.

125 tons, Cedar river pipe line and Mt. Vernon sewer project in Washington, to Northwest Steel Rolling Mills, Seattle.

120 tons, Brilliant pumping station, Pittsburgh, to unstated interest through John F. Casey Co.

110 tons, pumping plant, Mt. Vernon, N. Y., to Tidewater Structural Materials Corp., New York; Merrit, Chapman & Scott, general contractors.

105 tons barracks, Mitchell Field, Mineola, N. Y., to Kalman Steel Co., Chicago.

100 tons, apartment North Menlo avenue, Los Angeles, to Blue Diamond Co., Los Angeles.

Contracts Pending

2400 tons, including 1200 tons concrete bars and 1200 tons of fabricated units for Central-Lorain bridge, Cleveland; bids in Dec. 17.

1100 tons, construction work, Attica prison, Attica, N. Y.; William J. Gallagher, Medina, N. Y., general contractor.

700 tons, superstructure, Telegram building, West street, New York; general contract to Industrial Engineering Co.

500 tons, New Jersey approach, Hudson river bridge, Port of New York Authority; bids close Jan. 5.

400 tons, club and office building for Motors Association of Illinois, Chicago.

340 tons, warehouse, Bohack interests, Brooklyn, N. Y.; bids next week.

300 tons, highway route 10, section 1, New Jersey; bids in Dec. 22.

250 tons, Verdi high school, Chicago.

250 tons, Wendell Phillips high school, Chicago; general contract to Lind Construction Co., Chicago.

200 tons, hospital, Memphis, Tenn.

200 tons, James Ford Rhodes high school, Cleveland; John Grant & Son, Cleveland, low bidders on general contract.

200 tons, Valley Bank building, Phoenix, Ariz.; bids being taken.

168 tons, storage and distributing plant, Baton Rouge Electric Co., Baton Rouge, La.; A. C. Stewart, general contractor.

100 tons, highway, Westchester County Park commission, New York, contract 318, bids in.

100 tons, bridges and approaches, route 8, section 6, New Jersey, bids Dec. 22.

Steel Is 70 Per Cent of Materials for Radios

Material used annually by the radio industry, based on a production of 3,900,000 sets, including tubes, is figured by the electrical equipment division, department of commerce, as follows in net tons: Steel, 110,000; copper, 12,000; copper alloys, 4000; aluminum, 4000; tin, 1800; nickel and alloys, 1500; zinc, 1200; paper, 4365; synthetic resin products, 2600; glass, 3000; cloth insulation, 1000; and miscellaneous, 13,500; totaling 158,965 net tons.

Steel requirements are classified as follows:

	Net Tons
Sheets, strips, bars, etc.	
In sets	76,000
In speakers	32,350
Screws, nuts, washers, etc.	
In sets	1,150
In speakers	500

Cites Progress in Rails

Among achievements in applied science by the bureau of standards, Washington, Director George K. Burgess cites in his annual report to the secretary of commerce:

"Through an extensive co-operative investigation on the fabrication of railroad rails, it has been found that owing to the low ductility of certain kinds of steel at the temperature at which rails are rolled there is a tendency for the formation of nucleii within the rails from which transverse fissures may later develop in service. Certain changes in manufacturing procedure are suggested as a means of correcting the evil."

Pipe

Utility Needs Lead Buying—Large Lots More Numerous—Milwaukee Wants 6000 Tons

PIPE PRICES, PAGE 97

New York—Cast pipe prices incline toward weakness. More business at $35, eastern foundry, is noted. A new England project is reported placed well under this figure. One utility closed on approximately 5000 tons and two others are expected to buy several thousand tons this week. Bids for New York yard stocks will come out early in January. Several small projects, including three state jobs, have yet to be placed by contractors. New York is asking bids on 300 tons of 20-inch. DiMarco Co., White Plains, N. Y., was low on the sewage disposal plant at Rome, N. Y., requiring considerable cast pipe. Foundries operate about 50 per cent in some departments.

Ford, Bacon & Davis, 39 Broadway, are reported to be engineers for a natural gas pipe line on which preliminary plans have been prepared by Tri-Cities Utilities Ltd., care G. L. Ohrstrom, 40 Wall street. The line will run from Kinsella, Alta. to Regina, Sask., and cost approximately $20,000,000.

Boston—Pipe tonnage fell off last week. Milford, Mass., awarded 3½ miles of 8-inch to Warren Foundry & Pipe Co. Several utility interests are sounding out the market. Prices are firm.

Pittsburgh—Tubular products are in a dull market on new tonnage with activity enlivened only by discussion of prospective line pipe work. Such business involves mostly gathering lines for existing projects, including some for the Missouri-Kansas Pipe Line Co. and for the Continental Construction Co. line from Texas to Chicago. Standard pipe, oil country goods and tubing still are dull. Pipe mill operations continue around 35 per cent.

Milwaukee—This city will close bids Dec. 23 on 6000 tons of cast water pipe, 350 tons of special castings, 90 tons of offset pipe and 600 fire hydrants.

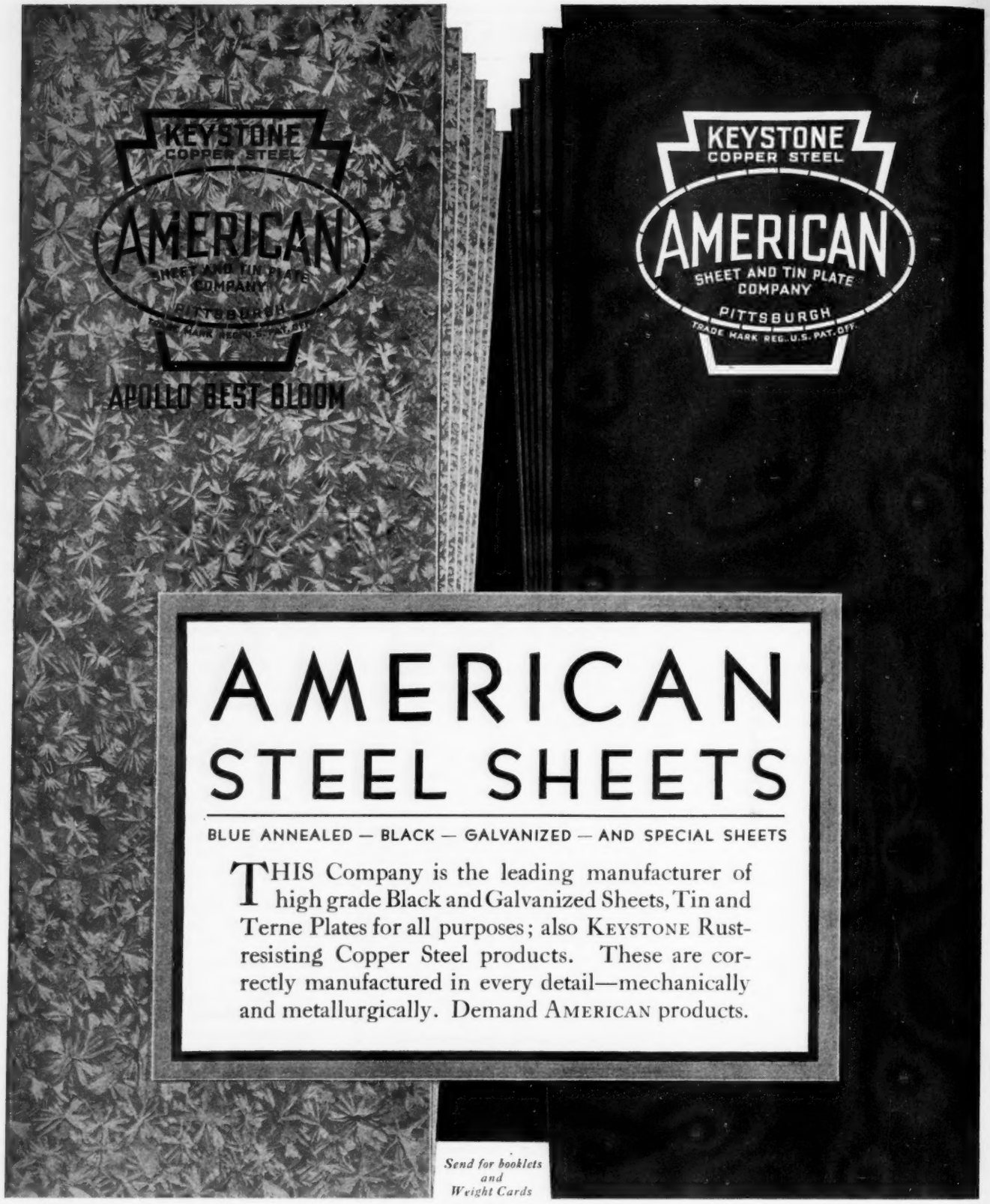
Chicago—Tabulation of bids for the 11,000 tons of cast pipe for Detroit shows prices around $30, Birmingham. Chicago let 1000 tons of 12-inch. Important utility requirements are to be out within the next 30 days. Pipe foundries have reduced stocks and several will be idle for the Christmas-New Year week. St. Cloud, Minn., is inquiring for 800 tons of 12 and 16-inch, and Clarkton, Mo., for 350 tons of 2 to 8-inch.

Birmingham, Ala.—Some cast pipe contracts are being booked but backlogs are dwindling since shipments are so active. Production will be maintained until Dec. 20, when shutdowns will be in order. Some shops expect to resume Dec. 29. Base prices, $37 to $38 on 6-inch and larger, remain unchanged.

Contracts Placed

5000 tons, cast pipe, first half requirements, United Gas Improvement Co., Philadelphia, divided among McWane Cast Iron Pipe Co. and American Cast Iron Pipe Co., Birmingham, Ala., and United States Pipe & Foundry Co., East Burlington, N. J.

3136 tons, 8 and 12-inch class 150 cast pipe for Los Angeles; 409 tons 8-inch to National Cast Iron Pipe Co., Birmingham, Ala.; 1226 tons 8-inch to Pacific States Cast Iron Pipe Co., San Francisco; 958 tons 12-inch to Utilities Equipment Corp., San Francisco, and



AMERICAN STEEL SHEETS

BLUE ANNEALED — BLACK — GALVANIZED — AND SPECIAL SHEETS

THIS Company is the leading manufacturer of high grade Black and Galvanized Sheets, Tin and Terne Plates for all purposes; also KEYSTONE Rust-resisting Copper Steel products. These are correctly manufactured in every detail—mechanically and metallurgically. Demand AMERICAN products.

Send for booklets and Weight Cards

US STEEL

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES:

AMERICAN BRIDGE COMPANY
AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY
COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
FEDERAL SHIPB'LDG. & DRY DOCK CO.
ILLINOIS STEEL COMPANY
NATIONAL TUBE COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & RAILROAD CO.
UNIVERSAL ATLAS CEMENT COMPANY

Pacific Coast Distributors—Columbia Steel Company, San Francisco, Calif.

Export Distributors—United States Steel Products Company, New York, N.Y.

545 tons 8-inch to American Cast Iron Pipe Co., Birmingham.
1100 tons, 6 to 12-inch cast pipe for Phoenix, Ariz., to unstated foundry.
1000 tons, various sizes, cast pipe for Fort Worth, Tex., to United States Pipe & Foundry Co., East Burlington, N. J.
1000 tons, 12-inch cast pipe for Chicago, to Glamorgan Pipe & Foundry Co., Lynchburg, Va.
400 tons, 10-inch cast pipe, water system extension, Orange, Va., to Glamorgan Pipe & Foundry Co., Lynchburg, Va.; 35 tons reinforcing bars to Truscon Steel Co., Youngstown, O.; J. B. McCrary Co., Atlanta, Ga., general contractor.
300 tons, 12 and 16-inch cast pipe for Franklin, Pa., to United States Pipe & Foundry Co., East Burlington, N. J.
175 tons of 10-inch cast pipe for 11-mile water works extension, Hanson, Mass., in addition to 1225 tons of 6 and 8-inch noted last week, to R. D. Wood & Co., Florence, N. J. Also 6 and 8-inch valves to Chapman Valve Co., Springfield, Mass.; specials and gate boxes to LeBaron Foundry Co., Brockton, Mass., and hydrants to Ludlow Valve Mfg. Co., Boston.
160 tons, 6 and 8-inch cast pipe for Tonawanda, N. Y., to United States Pipe & Foundry Co., East Burlington, N. J.
125 tons, 24-inch cast pipe for Hudson, N. Y., to unstated foundry.
100 tons, 8 to 12-inch pipe for Seattle, to American Cast Iron Pipe Co., Birmingham, Ala.
Unstated tonnage, 3½ miles of 8-inch cast pipe for Milford, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

Steel Pipe Orders

3000 tons, 38 and 51-inch welded steel pipe for Los Angeles, to Western Pipe & Steel Co., Los Angeles.
9000 tons, gas line in Louisiana, Phoenix Utility Co., to National Tube Co., Pittsburgh.

Contracts Pending

11,000 tons, 24 to 36-inch cast pipe for Detroit; Herbert Kennedy & Co., New York, representing French makers, Glamorgan Pipe & Foundry Co., Lynchburg, Va., James B. Clow & Sons, Chicago, and Lnchburg Foundry Co., Lynchburg, low bidders on various sizes delivered prices of approximately $39.50.
6000 tons of cast water pipe for Milwaukee, 350 tons of special castings; 90 tons offset pipe and 600 fire hydrants; pipe includes 2500 tons of 16-inch, 2000 tons of 8-inch, 1000 tons of 6-inch and 500 tons of 12-inch class C; bids close Dec. 23.
800 tons, 12 and 16-inch cast pipe for St. Cloud, Minn.; bids Dec. 16.
350 tons, 2 to 8-inch cast pipe for Clarkton, Mo.; bids in.
300 tons, 20-inch cast pipe for New York.
225 tons, 6 to 12-inch cast pipe for Brentwood, N. Y.; readvertised for general contract.
225 tons, 12 and 20-inch cast sewer pipe for New Rochelle, N. Y.; bids Dec. 19.
200 tons, 8 to 16-inch cast pipe for Westchester County Park commission, New York; bids Dec. 19.
160 tons, 20-inch cast pipe for El Paso, Tex.; bids in.
135 tons, 2-inch class 150 cast pipe for Long Beach, Calif.; Grinnell Co., low.
Unstated tonnage, 100 tons or more, cast pipe for sewage disposal plant, Rome, N. Y.

Wire

Manufacturers Buying Better Than Jobbers and Dealers—Contracting Is at 2.20c Base

WIRE PRICES, PAGE 75

Chicago—Jobber buying of common wire products is fair, but much below normal. Dealer sales remain extremely light. A few fair-sized manufacturers' wire orders have been placed. Several important buyers of plain wire have signed first quarter contracts at 2.25c, Chicago or Western mills, which would be on the basis of 2.20c Pittsburgh-Cleveland.

Worcester, Mass. — The market hopes that Chevrolet motor production will lead the way to an upturn soon. Conditions are relatively the same although some criticism is heard that smaller plants are cutting prices. Production remains at about 50 per cent generally. Plain bright wire to dealers is holding at 2.40c, base, Worcester.

New York—While some sales are still being made to the general trade at $1.90, Pittsburgh, the ruling price on nails to these interests is now $2. Jobbers generally are obtaining $1.90. Plain bright wire is 2.20c, Pittsburgh, the price recently announced for second quarter. Demand is light.

Pittsburgh — Wire tonnage is steady but light. Shipments approximate the November rate with low stocks necessitating little curtailment in buying over the inventory period. Regular contracts for first quarter are being entered at $1.90 to jobbers for wire nails and $2 to the trade. Plain wire is 2.20c to 2.30c and wire rods $35. This represents a decline of $1 a ton from the current quarter price on wire rods and $2 on plain wire.

Cleveland—Ordering is for the consumer's barest minimum. Orders continue currently small. Several manufacturers are taking inventory this week, jobbers the week between Christmas and the first of the year. Nails are $1.90 to $2; plain wire is 2.20c and 2.30c, the latter figure more representative of most orders. Wire rods are quotable at $35 to $36.

Philadelphia — Nails continue $1.90, Pittsburgh, in carloads. Plain wire is 2.20c to 2.30c, Pittsburgh.

Bolt, Nut, Rivet Use Better Than Had Been Expected

Bolts, Nuts, Rivets Prices, Page 75

Pittsburgh — Specifications for bolts, nuts and rivets, although still slow, are holding up better than was anticipated. Stocks are low but little further curtailment is noted. Contracting for first quarter is fairly well along, with prices steady at 73 off for bolts and nuts and 2.75 for large rivets.

New York—With prices on bolts, nuts and rivets for first quarter unchanged, little spot buying is noted and first quarter contracts are being signed slowly. The mill market is 73 off on bolts and nuts and 2.75c, Pittsburgh, on rivets. Eastern mills are operating 35 to 40 per cent.

Philadelphia — Rivets continue 2.75c, Pittsburgh, except for occasional shading on structural rivets. Bolts and nuts are unchanged at 73 off. Demand is small except for good orders included in track accessories being placed by eastern roads.

Chicago—First quarter contracting is about half completed. Specifications are a little heavier than in November, due to the recent mild pickup in automotive and tractor demand. Some jobber price irregularities exist in Twin Cities territory, but in general nuts and bolts are steady at 64 to 73 off list.

Cleveland—Bidders here on the inquiry from the navy department for a few carloads of nuts, bolts, machine bolts, lag screws, etc., on which it opened bids Dec. 9 have not yet been notified officially as to awards. The market is exceedingly quiet.

Refractory Sales Light as Repair Needs Lessen

Refractories Prices, Page 86

Pittsburgh—Sales of refractory brick are light and users have reduced stocks to the lowest level of the year. Repair work on open-hearth furnaces has been lessened by declining steelmaking operations while brick demand for blast furnace and stove relining recently has been materially lighter than earlier in the year. Sellers anticipate some recovery in business after the inventory period and are optimistic regarding next year's brick demand for steel plant improvement. Less activity in entirely new construction is looked for in 1931, however. Refractory prices are unchanged at $43 for first quality fire clay and silica brick, with second quality fire clay material continuing $35 to $38.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$17.50
Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley, furnace	17.00
Cleveland fur., local del.	17.50
Philadelphia, delivered	18.26 to 18.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	20.41 to 20.91
Buff., all-rail, Newark	18.28 to 18.78
Ala., Bir. fur., local del.	14.00
Alabama, del. Chicago	17.01 to 17.51
Alabama, del. St. Louis	14.42 to 15.42
Alabama, del. Cincinnati	14.69 to 16.19
Alabama, del. Cleveland	16.51 to 17.51
Ala., Phila., dock del.	16.75 to 17.25
Ala., Balt., dock del.	16.50 to 17.00
Alabama, New York dock	16.00 to 16.50
Ala., Boston dock del.	16.25 to 16.75
Tenn., Bir. base, local del.	14.00
Tennessee, del. Cinn.	14.69 to 16.69
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.76 to 19.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	19.26 to 19.76

MALLEABLE

Chicago, furnace	17.50
Cleveland fur., local del.	17.50
Pittsburgh district fur.	18.00
Pittsburgh, delivered	18.63 to 19.13
Valley furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	19.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.50 to 18.00
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley furnace	17.00

BESSEMER

Valley furnace	17.50
Pittsburgh, delivered	18.63 to 19.13
Pittsburgh, furnace	18.00

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 28.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chicago	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14 $31; 15—$33; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50 to 2.60
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	$9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell. basis	5.50
Portsmouth, O., ovens, Connell. basis	5.50
Buffalo ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross Ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56 63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	11.00
North African low phosphorus	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$12.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.50

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	27 to 28 cents
Indian, 48-50% (nom.)	27 to 28 cents
Brazilian, 46-48% (nom.)	25 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$43.00
Georgia, Alabama	40.00 to 47.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00 to 38.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	36.30
Chicago	32.00
Forging, Chicago	37.00
Forging, Pittsburgh	36.00
Forgings, Philadelphia	41.30

SHEET BARS

Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00
Chicago	32.00

SLABS

Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	$35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-21%, domestic fur. spot†	30.00
*Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	13.00 to 15.00
Ferrochrome, 66-70 chromium, 4-6 carbon. cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.12 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	160.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

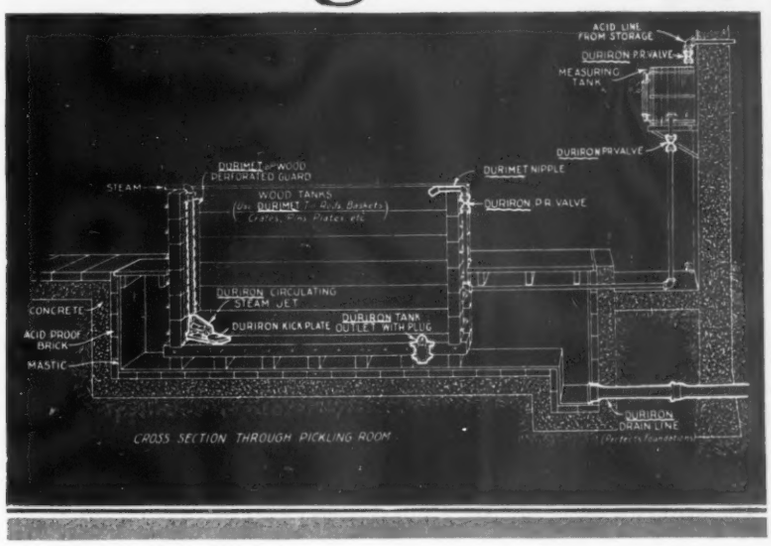
*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

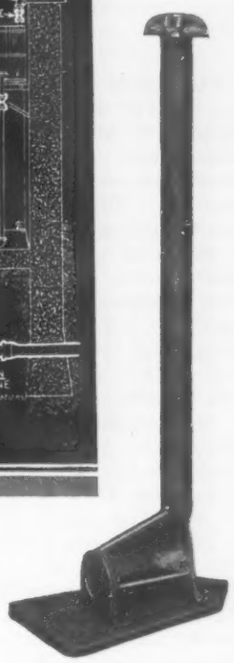
Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$17.25
Washed gravel, import duty paid east, tide, gross ton	19.50

For Pickling Economy





Duriron Circulating Steam Jet

WHERE is your greatest preventable loss in pickling? Acid leakage and waste? Equipment depreciation and replacements which interrupt production? ***There is a simple remedy.*** You ***can*** have wooden pickling tanks that stay tight. You ***can*** have tank fittings that are acid proof. You ***can*** have acid valves that do not corrode.——¶Do you realize that one of the chief advantages of a Duriron Circulating Steam Jet is the elimination of ***"hammering"***? Stop that vibration and you stop the cause of leaky tank joints, and acid wastage.——¶For the same reason you will save money by utilizing Duriron and Durimet throughout. The difference in first cost becomes insignificant in comparison with the elimination of replacements and the time loss they impose.——¶Consider the equipment tabulated below. Plan your next pickling layout renewal for ultimate economy.

The No. 80 Self-priming Duriron Pump obviates the necessity of elevating acid storage tanks.

The DURIRON COMPANY, INC., 434 N. Findlay St., Dayton, O.
Sales Offices in 36 Principal Cities

Duriron Circulating Steam Jets.
Duriron Plug Cocks for the acid lines.
Duriron Tank Outlets (for wooden or other tanks)
Duriron Soil Pipe for the acid waste drains.
Duriron Centrifugal Pumps for acid handling.
Duriron Flanged Pipe and Fittings for acid handling.
Duriron Fans for ventilation systems.
Durimet Fabricated Pickling Tanks, Tie-rods, Bolts and Nuts, Racks and Pins, Crates, Hooks, Wearing Plates, etc.

DURIRON

Ask for Bulletin 30-620 on Pickling Equipment. Just issued!

D-99

Pig Iron

Large Sales for First Quarter Made in Middle West—Valley Dull—More Furnaces Out

PIG IRON PRICES, PAGE 86

Pittsburgh—Improvement in pig iron activity is mild. Producers are adding first quarter tonnages to their books mainly in small lots, with many consumers continuing to buy only as required. The improbability of advancing prices early in the new year is deterring the placing of forward requirements. Current shipments for some producers are ahead of those in November but a decline is looked for during the remainder of the month, and further curtailment in production schedules is expected this week to avoid expansion in stocks. Large inquiry is lacking. Westinghouse Electric & Mfg. Co. placed an unstated tonnage for Trafford City, Pa. Prices are not being put to a real test, but are receiving less pressure from outside competition.

Boston—Not more than 1200 tons of pig iron was sold in New England district during the past week. Westinghouse Electric & Mfg. Co. placed 250 tons for its Springfield, Mass., plant.

New York—About 8000 tons of pig iron was sold here in the past week. Competition is sharp, with Buffalo iron offered at $15 to $16, base, furnace, and southern iron $16 to $16.50, delivered, New York docks. New England iron which now is being stored at Kearny, N. J., is offered at around $18, delivered to nearby points in northern New Jersey. Outstanding inquiries include 3000 tons for the Thatcher Furnace Co., Garwood, N. J., previously noted, and 2400 tons for the Worthington Pump & Machinery Corp. Of the latter 1700 tons of bessemer, No. 2X and No. 1X is for Buffalo, 500 tons of No. 1X for Harrison, N. J., and 200 tons of bessemer, No. 2X and No. 2 plain for Holyoke, Mass.

The navy will take bids until Dec. 19 on 230 tons of pig iron for delivery to Boston.

Philadelphia—Foundry iron sales are restricted to small and moderate tonnages, usually for early shipment. Eastern Pennsylvania foundry iron continues $17.50 to $18, base, furnace, subject to occasional concessions to meet lower delivered prices on Birmingham iron. Basic and low phosphorus are featureless.

Buffalo—Sales, inquiry and shipments are inactive. One furnace of the four remaining in operation here has been banked for a few days. Some sellers think the general situation is now more fundamentally promising than at any time during this year.

Youngstown, O.—Little attention is being paid by consumers of merchant pig iron to contracting for first quarter. Ingot mold foundries in the district run about half time, taking the bulk of the merchant iron moved in this district in a molten state. No. 2 foundry holds at $17, valley, and malleable at $17.50. The Youngstown Sheet & Tube Co. this week banked two stacks at its Campbell works, leaving only six stacks active out of 34 blast furnaces in this district.

Cleveland—An active week in pig sales evidently brought no further dip in prices, and revealed a little strengthening in some districts. Cleveland furnaces booked the largest tonnage in several months, at $17.50, base, furnace, for local delivery, and at a minimum of $16, base, for shipment to outside competitive territory. On some sales made in southern Ohio $16.25, base, applied. Less competition is noted from other lake furnaces. Westinghouse Electric & Mfg. Co. divided 2000 tons for its Cleveland plant between two local furnace interests. The lake furnace companies with headquarters in Cleveland booked 28,000 tons for first quarter in the past week, almost double the tonnage of the preceding week. Shipments are slower this month than in November, but the decline has been less than expected. In some districts the melt has improved slightly, offsetting a reduction in others.

Cincinnati — Inventories are low and larger sales are expected after Jan. 1. Sales in the past week totaled 1600 tons. Southern iron holds at $11 to $11.50, base, furnace. The American Rolling Mill Co. has relighted one of its stacks at Ashland, Ky.

Chicago—Several releases for January pig iron shipments are coming in. December will prove to be the heaviest sales month of the year. Important tonnages still are under negotiation or on inquiry, and estimates are that about 40 per cent of the expected first quarter production is under contract. A northern Illinois melter is inquiring for 500 tons, including low phosphorus, and about 150 tons of southern specification. The reported price now being offered on southern iron here figures to $10.50, base, Birmingham. Chicago furnaces hold to $17.50, base.

St. Louis—Business is virtually at a standstill. The week's sales were the smallest of any like period in months. The base grade of southern iron is offered at $10.50, furnace, but higher silicon iron is offered at a price equivalent to $10, furnace, for No. 2. Extremely low figures have been offered on special grades, not always acceptable to consumers. Northern furnace prices are steady.

Birmingham, Ala.—Sales are unsatisfactory, though books are open for first quarter. Two stacks have been blown out this month and two more are scheduled to go out in the next two or three weeks, stocks being sufficient to meet all demands. Local prices are unchanged.

Toronto, Ont.—Spot sales constitute the bulk of business. Few contracts have been placed for first quarter. Prices are unchanged.

Ferroalloys Quiet; English Ferromanganese Reduced

Ferroalloy Prices, Page 86

New York—An English seller has conformed to the newly announced $85, duty paid, price on ferromanganese. Contracting at the new figure is slow. Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $30, furnace, subject to differentials. Consumers are specifying lightly.

Pittsburgh—Contracting for first half requirements of ferromanganese is quiet, with the market for that period now $89.79, delivered Pittsburgh. Spiegeleisen is $30, furnace, for small lots. Some new contracts are being booked. Other ferroalloys continue quiet. Ferrotungsten usually is $1.15 but demand is dull.

Chicago—Several large buyers of ferroalloys are holding back on 1931 purchases.

Tin Plate Market Active; Mill Operations Improve

Tin Plate Prices, Page 75

Pittsburgh—Tin mill operations continue to improve. The current rate now is about 50 per cent and reflects heavier production for January shipments. Schedules were curtailed during November with consumers desiring to hold stocks low during December, and the recent upturn follows the usual seasonal trend. Contracting for the first half of 1931 is fairly active with the market continuing $5 per base box.

Scrap

Consumers Refusing to Sell at Current Prices Brings Reaction —Small Melt Limits Sales

Chicago—Due to further limiting of open hearth steel shipments by a leading steelworks melter, the lower trend of steelworks operations, and the failure of recent inquiries to materialize, the late mild strengthening of the iron and steel scrap market has been given another setback. Dealer trading is on a moderately lower price basis. Dealers are obtaining melting steel at $10 to $10.25, while the consumer range, in the absence of recent orders from that group, is nominal at $10 to $10.50. Lists quoting consumer prices are not truly representative of the market because of no recent tonnage sales. While inquiries for small lots have shown mild activity, shipments are being curtailed on every hand. Short coverage has

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.50 to 7.00
Buffalo, No. 1	10.75 to 11.25
Buffalo, No. 2	9.25 to 9.75
Chicago	10.00 to 10.50
Cinci., deal.	9.50 to 10.00
Cleve., No. 1	10.25 to 10.75
Cleve., No. 2	9.75 to 10.25
Det. No. 1 deal	9.50 to 10.00
Det., No. 2 deal	7.00 to 7.50
E. Pa. del. mill	10.75 to 11.25
N. Y. del. R. R.	7.50
N. Y. deal. No. 2	5.50
N. Y., deal. yd.	5.50
Pitts., No. 1	12.50 to 13.00
St. L. No. 1 sel	10.50 to 11.00
Federal, Ill.	9.50 to 10.00
Granite C., Ill.	9.00 to 9.50
Valleys, No. 1	12.00 to 12.50

COMPRESSED SHEETS

Buffalo, dealers	9.25 to 9.75
Chicago	8.75 to 9.25
Cleveland	9.00 to 9.50
Detroit, dealers	8.75 to 9.25
E. Pa. new mat	9.75 to 10.25
Pittsburgh	12.00 to 12.50
Valleys	11.50 to 12.00

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.75 to 9.25
Cleveland	7.00 to 7.50
Eastern Pa.	9.00
Pittsburgh	10.00 to 10.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.50 to 6.00
Cincinnati	5.00 to 5.50
Detroit, dealers	6.50 to 7.00
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.00
Buffalo	14.00 to 14.50
Chicago (3 ft.)	12.00 to 12.50
Chicago (2 ft.)	12.50 to 13.00
Cinci., deal.	15.50 to 16.00
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	13.50 to 14.00

STOVE PLATE

Birmingham	8.50 to 9.00
Boston, con.	8.00 to 8.50
Buffalo	9.00 to 9.25
Chicago, net	6.50 to 7.00
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00
N. Y., deal. mill	4.75
St. Louis	8.00 to 8.50

COUPLERS, SPRINGS

Buffalo	13.50 to 14.00
Chicago	12.00 to 12.50
Eastern Pa.	16.00 to 16.50
Pittsburgh	16.00 to 16.50
St. Louis	11.00 to 11.50

ANGLE BARS—STEEL

Chicago	12.00 to 12.50
St. Louis	9.50 to 10.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	16.50 to 17.00
Eastern Pa.	17.00
Pittsburgh billet, bloom crops	17.50 to 18.00
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.00 to 10.50
St. Louis	10.50 to 11.00

SHOVELING STEEL

Chicago	10.00 to 10.50
Cleveland	6.75 to 7.25
St. Louis	9.50 to 10.00

RAILROAD WROUGHT

Birmingham	9.50 to 10.00
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.50 to 9.00
Buffalo, No. 2	11.00 to 11.50
Chicago, No. 1	10.00 to 10.50
Chicago, No. 2	10.00 to 10.50
Cinci., No. 2	9.50 to 10.00
Eastern Pa.	13.50
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.50 to 13.00
St. Louis, No. 1	7.75 to 8.25
St. Louis, No. 2	9.50 to 10.00

SPECIFICATION PIPE

Boston	6.50 to 7.00
Eastern Pa.	11.50 to 12.00
N. Y., deal	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.25 to 9.75
Chicago, No. 1	8.00 to 8.50
Cinn., No. 1 dl	8.00 to 8.50
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	6.00 to 6.50
Det., No. 1 new deal.	8.25 to 8.75
St. L. No. 1	7.00 to 7.50
Val. new No. 1	11.50 to 12.00

MACHINE TURNINGS

Birmingham	7.50 to 8.00
Boston, dealers	2.00 to 2.50
Buffalo	6.00 to 6.50
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.75 to 5.25
Detroit	3.75 to 4.25
Eastern Pa.	6.50 to 7.50
N. Y., deal.	3.00
Pittsburgh	6.00 to 6.50
St. Louis	4.00 to 4.50
Valleys	6.00 to 6.50

BORINGS AND TURNINGS For Blast Furnace Use

Boston	2.00 to 2.10
Buffalo	7.00 to 7.50
Cinn., deal.	4.50 to 5.00
Cleveland	6.75 to 7.25
Detroit, deal	4.75 to 5.25
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	7.00 to 7.50

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	7.50 to 8.00
Boston., chem.	9.00 to 9.50
Boston, deal.	2.00 to 2.50
Buffalo	7.00 to 7.50
Chicago	4.50 to 5.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.75 to 7.25
Detroit, deal	4.75 to 5.25
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	14.50
N. Y., deal.	3.50
Pittsburgh	7.00 to 7.50
St. Louis	6.00 to 6.50

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.00 to 7.50
Chicago net	6.50 to 7.00
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	7.50 to 8.00

FORGE FLASHINGS

Boston, deal.	6.00 to 6.25
Buffalo	9.25 to 9.75
Cleve. ov. 10 in.	9.00 to 9.50
Detroit	8.50 to 9.00

FORGE SCRAP

Boston, del.	5.50 to 6.00
Chicago	13.50 to 14.00
Eastern Pa.	11.00

ARCH BARS, TRANSOMS

Chicago, net	11.50 to 12.00
St. Louis	11.50 to 12.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	10.50 to 11.00
Chi., steelworks	6.50 to 7.00
Cleveland	9.50 to 10.00
Eastern Pa.	11.00
Pittsburgh	11.00 to 11.50
St. Louis	7.50 to 8.00

STEEL CAR AXLES

Birmingham	14.00 to 15.00
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	15.10 to 15.70
Eastern Pa.	20.50
St. Louis	14.00 to 14.50

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	12.90 to 13.45
N. Y., deal.	13.00 to 14.00
St. Louis	12.00 to 12.50
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 11.00
Boston, iron	14.00 to 14.50
Buffalo, iron	13.00 to 13.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	11.50 to 12.00
Chi., roll steel	13.50 to 14.00
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.50 to 16.00
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.50 to 14.00
Pitts., steel	16.00 to 16.50
St. Louis iron	10.50 to 11.00
St. Louis, steel	13.00 to 13.50

NO. 1 CAST SCRAP

Birming., cup.	10.00 to 10.50
Buffalo (mac.)	10.50 to 11.00
Boston, textile	11.50 to 12.50
Chicago, mach.	10.65 to 11.20
Chi., railroad	10.10 to 10.65
Chicago, agri.	9.50 to 10.10
Cinn., mach. cup., gross	13.50 to 14.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	12.50 to 13.00
N. Y. cup. deal	8.00 to 8.50
N. Y., del. local foundries	14.00
Pitts., cupola	12.50 to 13.00
San Fran., del.	13.50 to 14.00
Seattle	14.00 to 14.25
St. L. No. 1 ma	9.75 to 10.25
St. L. No. 1	9.00 to 9.50

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast	11.50 to 12.50
Buffalo, break	7.00 to 7.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl	7.00 to 8.00
N. Y. break. dl	7.00
Pittsburgh	9.00 to 9.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	13.00 to 13.50
Chicago, agri.	11.00 to 11.50
Chicago, R. R.	12.00 to 12.50
Cinn., R. R. dl.	12.00 to 12.50
Cinn., agri., dl.	12.00 to 12.50
Cleve., rail	12.50 to 13.00
Det. auto deal.	11.00 to 11.50
St. Louis, rail	10.00 to 10.50

RAILS FOR ROLLING 5 feet and over

Birmingham	11.25 to 11.75
Boston	8.50 to 9.00
Buffalo	10.00 to 10.50
Chicago	13.00 to 13.50
Eastern Pa.	13.00 to 13.50
New York	9.50 to 10.00
St Louis	11.25 to 11.75

LOCOMOTIVE TIRES

Chicago, cut	13.00 to 13.50
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

Chicago	12.00 to 12.50
Pittsburgh	15.00 to 15.50
Eastern Pa.	15.50 to 16.50
Buffalo	14.00 to 14.50

SPECIAL SHAPES
COLD DRAWN

WYCKOFF
DRAWN STEEL COMPANY

General Offices:
FRICK BLDG., PITTSBURGH, PA.

Mills at: **AMBRIDGE, PA. and CHICAGO**

Sales Offices:

BOSTON—627 New C. of C. Bldg. BUFFALO—1312 Liberty Bank Bldg. DENVER—1037 U. S. Nat'l Bank Bldg.
ST. LOUIS—Planters Bldg. DAYTON—1128 The 3rd Nat'l Bldg. MINNEAPOLIS—332 Builders Exchange
CLEVELAND—Rockefeller Bldg. MILWAUKEE—288 E. Water St. PHILADELPHIA—133 So. 36th St.

Chicago Office: 3200 So. Kedzie Ave. *Detroit Office and Warehouse: 6189 Hamilton Ave.*
Pacific Coast Representatives: F. H. Currie, 309 Pacific Mutual Bldg., Los Angeles, Cal.

WYCo STEELS

subsided in proportion with the recent decrease in unfilled orders. Dealers find it difficult to buy borings under $5. The consumer market at $3.50 to $4 is based on the recent sales in St. Louis territory, which netted sellers $4 and lower in the Chicago switching district.

Boston — Conditions show no change in the scrap market and prices held firm the past week. On the small business moving brokers and dealers refused to shade. Sellers still are out of the market.

New York—Dullness in scrap continues more pronounced as the holiday season approaches. Orders are light and scattered. Prices are easy but nominally unchanged, with No. 1 railroad steel still $7.50, New York.

Philadelphia — Some difficulty is being encountered by dealers in obtaining scrap because some producers refused to sell accumulations at present prices. In one case a producer refused to sell axle turnings below $11, delivered, in spite of recent sales at $9.50 to $10. The result was a sale at $11. Shafting is coming out slowly and it is difficult to fill orders at $18. Chemical borings are firmer and harder to get under $14.50. Several eastern mills are practically out of the market for the remainder of the year. While heavy melting steel is quoted at $10.75 to $11.25, some recent business has been done even lower than $10.50.

Pittsburgh—Steel and iron scrap is quiet and generally unchanged. New buying is confined mostly to low phosphorus and railroad specialty grades with mills out of the market for heavy melting steel or compressed sheets. Blast furnace material also is inactive. Heavy melting steel continues at $12.50 to $13.

Buffalo—The three largest steelworks here have embargoes on all grades of scrap. There is no demand for blast furnace material, although dealers claim unfilled orders of good size are outstanding. Some material is being received but only machine shop turnings are being delivered. Lack of buying and the embargoes have brought about entirely nominal prices.

Cleveland—Iron and steel scrap continues dull. One steelworks consumer has taken a few cars of material against old contracts during the past few days, but this has been insufficient to buoy the market. The other important consumer of open-hearth scrap here still holds up shipments. A few specialties are moving to foundries. Heavy melting steel is quoted fractionally lower. Most quotations, however, are nominal in absence of trading. Further holdups are reported in the valley, accentuating dullness there.

Cincinnati — Light specifications for scrap are being released by a mill that had suspended shipments for several months. This, with increased inquiry, has given the market a brighter outlook for first quarter despite present sluggishness. Prices are nominally unchanged. Recent railroad scrap lists brought bids which on the whole supported present quotations.

St. Louis—Steel and iron scrap are marking time. Neither buyers nor sellers are disposed to deal heavily, and until next year no considerable tonnages are expected to change hands.

Despite scant trading the market is not weak. No price reductions were made the past ten days or two weeks, and there is little evidence of distress material.

Birmingham, Ala.—Trading in steel and iron scrap is dull, with no sign of early improvement. Better conditions among consumers are expected from present indications.

Toronto, Ont.—Demand for iron and steel scrap continues dull. Mills are practically out of the market for steel grades. Iron grades are improving slightly, with machinery cast still well in the lead. Demand is confined largely to spot needs, although inquiries indicate some future buying soon. Prices are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Coke

Furnace Fuel Is Slightly Easier —$2.40 on Some Orders— Foundry Requirements Lower

COKE PRICES, PAGE 86

Pittsburgh—Beehive coke shipments on contracts are holding close to the November rate. New business in all grades is light. Furnace coke demand is dull for blast furnace use, but shipments to water gas producers are slightly better. Most producers are holding to $2.50, minimum, small lots commanding up to $2.60, and occasional sales reported at $2.40. Foundry requirements are off slightly since a month ago, while sales of heating fuel vary with the temperature.

Beehive coke production in the production in the Connellsville district during the week ending Dec. 6 was 14,390 tons against 16,050 tons the preceding week, and 42,120 tons the corresponding week of last year, according to the *Connellsville Courier*.

Boston—Demand for heating coke is brisk, but foundries are not increasing orders. Prices are steady.

New York—Notwithstanding colder weather the movement of beehive furnace coke shows little gain, with prices easy at $2.50 to $2.65, Connellsville. Trading in beehive foundry coke also is featureless at $3.50 to $3.75, Connellsville, for the standard grades. Premium brands are $4.70 to $4.85, Latrobe, Pa. By-product coke is $9 to $9.40, Newark, N. J.; $11 New England; and $9, Philadelphia.

Philadelphia—Some delay is reported in shipments of foundry coke because of heavy consumption of by-product coke for domestic and general heating purposes.

Chicago — December by-product foundry coke shipments are gaining over November, due to heavier use in heating foundries and for core-making. Prices are unchanged.

Cincinnati—Except in isolated instances, specifications for by-product foundry coke have decreased due chiefly to seasonal influences. The price is steady.

St. Louis—Coke deliveries are unusually light. According to one leading by-product interest orders for delivery in the first half of 1931 are considerably smaller than the average during the past five years. Most consumers are dealing in the open market as needs arise.

Gary Structural Steel Co., Gary, Ind., is the new name of the former Walter Bates Steel Corp.

Pacific Coast

Small Tonnages Keep Mills Occupied—Prospects for Better Buying Promise Enlarged Tonnages—Los Angeles Places 3000 Tons Cast Pipe—Prices Do Not Follow Increase Made in East On Bars, Plates, Shapes

San Francisco—(*By Air Mail*)—Although awards of steel products were not numerous this week, several fair-sized tonnages were placed. Featuring the awards were over 3000 tons of cast iron pipe for Los Angeles. The largest new inquiry calls for 1300 tons of structural shapes for an auditorium in Pasadena, Calif. Prices appear somewhat firmer, although no advance has been made in shape, bar and plate quotations, following the higher prices announced last week in eastern centers.

Bars, Plates and Shapes

Awards of concrete bars totaled 635 tons. The aggregate for the year is 12,000 tons under the total for the same period last year. Soule Steel Co. has booked 350 tons for the Paramount theater, Oakland, Calif. An unnamed interest took 100 tons for an apartment on Menlo avenue, Los Angeles. New inquiries include 200 tons for an office building in Phoenix. No change is noted in out-of-stock prices, 2.50c, base, on carload lots, prevailing in the San Francisco and Los Angeles sections.

Los Angeles has awarded the Western Pipe & Steel Co., San Francisco, over 3000 tons of plates for a 38 and 51-inch welded steel pipe line. Other awards were confined to lots of less than 100 tons. The United States bureau of reclamation opened bids at Denver this week for 243 tons for two tanks to be placed near Boulder City, Nev. Quotations continue unchanged at 2.05c to 2.15c, c.i.f.

Structural shape awards totaled 1240 tons. To date this year 108,794 tons have been placed compared with 183,815 tons for the same period in 1929. The only awards of importance involved 750 tons for a theater in Los Angeles and 100 tons for an addition to a school in Pasadena, Calif., booked by the Consolidated Steel Corp., Los Angeles, and the Minneapolis-Moline Power & Implement Co., Minneapolis, respectively. Bids will be opened Dec. 23 for 365 tons for a bridge over the Russian river near Santa Rosa, Calif., and Dec. 22 for 225 tons for a subway in San Jose, Calif., for the Southern Pacific Co. Plain material ranges from 2.15c to 2.25c, c.i.f.

Other Finished Material

Cast iron pipe awards were the largest in over nine weeks and totaled 3888 tons. Los Angeles placed 409 tons with the National Cast Iron Pipe Co., 1226 tons with the Pacific States Cast Iron Pipe Co., 958 tons with R. D. Wood & Co., and 545 tons with the American Cast Iron Pipe Co. Grinnell Co. was low bidder on 135 tons for Long Beach, Calif. Redwood City, Calif., will open bids Dec. 22 for 147 tons of 6 and 8-inch pipe. Over 1100 tons are still pending for a distributing system in Phoenix, Ariz. The Associated Oil Co. has an inquiry out for 55 miles of 6⅝-inch seamless pipe.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Seattle Demand Dull

Seattle—Indications are favorable for increased activity early in 1931, based on the number of projects up for figures or proposed for decision in the near future. Business is quiet in the meantime, but December is always an inactive month with inventory at hand, construction slowed down and buying deferred.

Bars, Plates and Shapes

Local mills continue on unchanged operations with a fair number of orders, mostly small tonnages, on books. Merchant bars are not in active demand, mill prices steady at 2.25c. Concrete bars are quoted at 2.30c. Northwest Steel Rolling Mills, Seattle, booked 625 tons this week, of which 500 tons are for a warehouse building for the American Can Co., Seattle, while 125 tons are required for the Seattle Cedar river water pipe line and a sewer pipe project at Mt. Vernon. Pacific Coast Steel Corp. is furnishing less than 100 tons for an apartment building in Ninth avenue, Seattle.

No awards of plates were noted this week although local firms are figuring on 100 tons for tanks for the Ford assembly plant, Seattle. The Beacon Hill pipe line job, a 54-inch water main, will probably call for alternate figures on concrete, cast iron and wood stave, as well as steel.

Hofius Steel & Equipment Co. has the contract to fabricate 100 tons of shapes for the new Seattle plant of the Pioneer Sand & Gravel Co. Several important structural jobs are pending, including 3300 tons for the Ford plant, Seattle, 300 tons for a warehouse at the Navy yard and 400 tons for the Isthmus bridge, Coos Bay, Oreg., general contract awarded to Bere, Liesch & Tofts, Marshfield, Oreg. Seattle engineers are preparing plans for the proposed Emerson street span, which is a $200,000 project.

Finished Materials

Wholesale jobbers are finding business no worse than expected in December. Trade is spotted but in some lines it is heavier than a month ago. Depression in lumber and logging is affecting the wholesale trade, as buying from this source has been far below normal this year. No item is in particular demand, all buying at present being out of stock. Price lists are steady and unchanged.

Pipe Outlook Is Good

While no awards were reported this week, the outlook for cast iron goods is particularly promising. Proposed projects involved a large tonnage of pipe and accessories. Renton, Wash., has rejected bids calling for 135 tons of 10-inch pipe. The Dalles, Oreg., will receive bids for supplying 175 tons of 6 and 8-inch and accessories, Dec. 15. Portland, Oreg., has under consideration bids for supplying gate valves. Chehalis, Wash., will invite bids soon for 10,000 feet of cast iron main. Empire, Oreg., is planning a new water system, while Camas, Wash., is considering a proposed water system. Bellingham, Wash., is discussing plans for city water improvements for which $500,000 is available. W. C. Morse, Seattle, engineer, has been commissioned to construct a water supply system for La Conner, Wash., to cost $40,000.

Vernon, B. C., has adopted new plans for obtaining an additional water supply. North Vancouver, B. C., will open bids Dec. 15 for furnishing 5000 feet of 8-inch and 8000 feet of 6-inch pipe.

Old Materials Are Weak

The scrap markets continue weak at $9, gross, with local mills overstocked and no export demand.

244 Pages
6 x 9 In.

The Manufacture of Steel Sheets

By Edward S. Lawrence

116 Illustrations
9 Tables

Should be of interest to—

- Purchasing agents, automobile companies.
- Metallurgists, sheet mills.
- Engineering departments, automobile concerns.
- Sales departments, sheet makers.
- Automobile body manufacturers.
- Sheet stamping companies, engineers and diemakers.
- Rolling mill builders.
- Annealing furnace makers.

Mill methods of processing automobile sheets never have been revealed in logical order to those who purchase and use them. This book has been written in the hope that it may assist in better acquainting members of the engineering and operating staffs of the automotive and allied industries with the principal steps involved in the manufacture of steel sheets. The author not only has attempted to present the various operations of sheetmaking in appropriate sequence, but also to simplify the technical aspects of manufacture so that they can be understood easily by the layman.

The scope of the work may be inferred from the 14 chapter headings which include: Basic Open-Hearth Practice, Rolling Blooms and Sheet Bars, Structure of Low-Carbon Steel Sheets, Hot Sheet Mill Practice, Pickling of Steel Sheets, Cold Rolling Practice, Box Annealing of Steel Sheets, Normalizing of Steel Sheets, Continuous Box Annealing of Steel Sheets, Physical and Microscopic Examination, Surface Inspection and Nature of Defect and Processing and Application.

Discussions are presented so that they can be correlated with their effect on the stamping and appearance of the finished product. This plan was followed to show the difficulties associated with processing. While the manufacturing steps are explained in detail they are not discussed to such an extent that the reader will lose sight of their relation to the finished sheet and its ultimate use. In addition to 116 illustrations, a detailed list of contents and a cross index of over 760 items, the text includes nine tables.

Price, Postpaid { $6.15 in U. S. and Canada / 30s. 6d. in other countries

The Penton Publishing Co.
Book Department
1213-35 W. 3rd St., Cleveland, O.

Date.....

Enclosed find { $6.15 / 30s. 6d. } for which send one copy of "The Manufacture of Steel Sheets" by Edward S. Lawrence.

Name.....

No. and Street.....

City.....State.....

NOTICE

Buyers in Europe can save time by addressing their orders direct to *The Penton Publishing Co., Caxton House, Westminster, London, S. W. 1.* All orders should be made out on this form for convenience and legibility.

148-S.D.

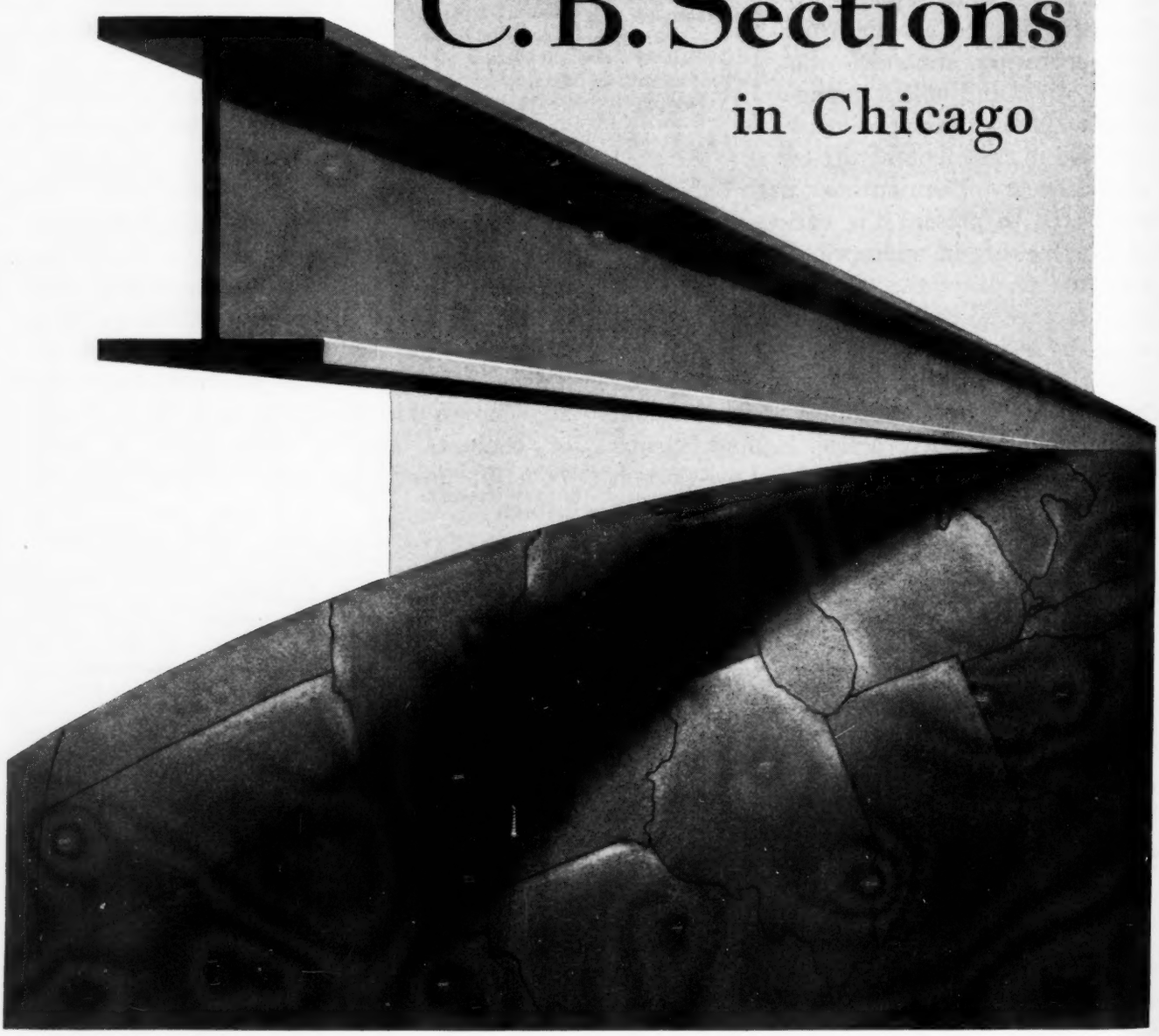
Illinois Steel Company

Subsidiary of United States Steel Corporation

soon will announce
the production of

C. B. Sections

in Chicago



Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
½	58	44½	½	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir..... $37.00 to 38.00
Four-inch, Birmingham..... 41.00 to 42.00
Four-inch, Chicago ..... 49.20 to 50.20
Six to 24-inch, Chicago..... 45.20 to 46.20
Six-inch and over, N. Y. .... 38.50 to 40.50
Four-inch, New York ..... 41.50 to 42.50
Stand. fittings, Bir. base..... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los. Ang.	3.40c
New York‡(d)	3.10c
Philadelphia .	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans. ..	3.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia .	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFOR. BARS

Baltimore 2.50c-3.31c	
Boston	3.265c
Buffalo	2.95c
Chattanooga..	3.10c
Cincinnati	3.15c
Cleveland ..2.25c-2.44c	
Detroit	3.00c
Houston	3.00c
Los Ang. cl....	2.40c
Los Ang. lcl..	2.70c
New York..2.65c-3.10c	
Phila. 2.40c-3.00c	
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.60c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young. 2.30c-2.60c	

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.40c
New York(d)	3.10c
Philadelphia .	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland. ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles..	3.40c
New York(d)	3.30c
Philadelphia .	2.50c
Phila. floor....	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

NO. 10 BLUE

Baltimore	3.50c
Bost. 3/16-in.	9.915c
Buffalo	3.50c
Chattanooga..	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)....3.20c-3.40c	
Portland	4.00c
Phila.*†	3.05c
Pitts.**	2.75c
San Fran.	3.80c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.75c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	4.05c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York...3.55c-3.65c	
Phila.*†	3.60c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.35c
Seattle	4.50c
St. Louis	4.05c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.25c
Boston	5.45c
Buffalo 4.40c-4.60c	
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.90c
Cleveland***..	4.35c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York....4.10c-4.25c	
Phila.*†	4.15c
Pitts.**	4.00c
Portland	5.00c
San Fran.	5.00c
Seattle	5.00c
St. Louis	4.60c
St. Paul	4.23c
Tulsa 4.60c-4.75c	

BANDS

Baltimore	3.50c
Boston 4.015c-5.00c	
Buffalo	3.50c
Chattanooga..	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter....	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia .	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston 5.50c-6.00c	
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter ..	3.80c
New York	3.75c
Philadelphia .	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.70c

COLD FIN. STEEL

Rounds & Hexagons

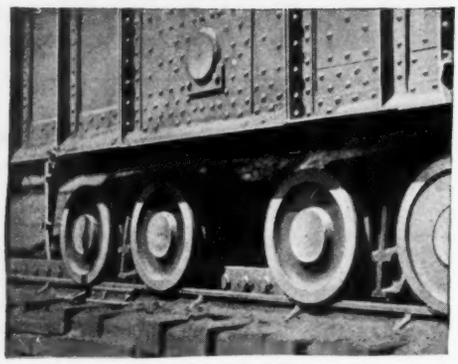
Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.35c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.50c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San. Fran.(a)	4.25c
Seattle (a)....	4.75c
St. Paul (a)..	3.35c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

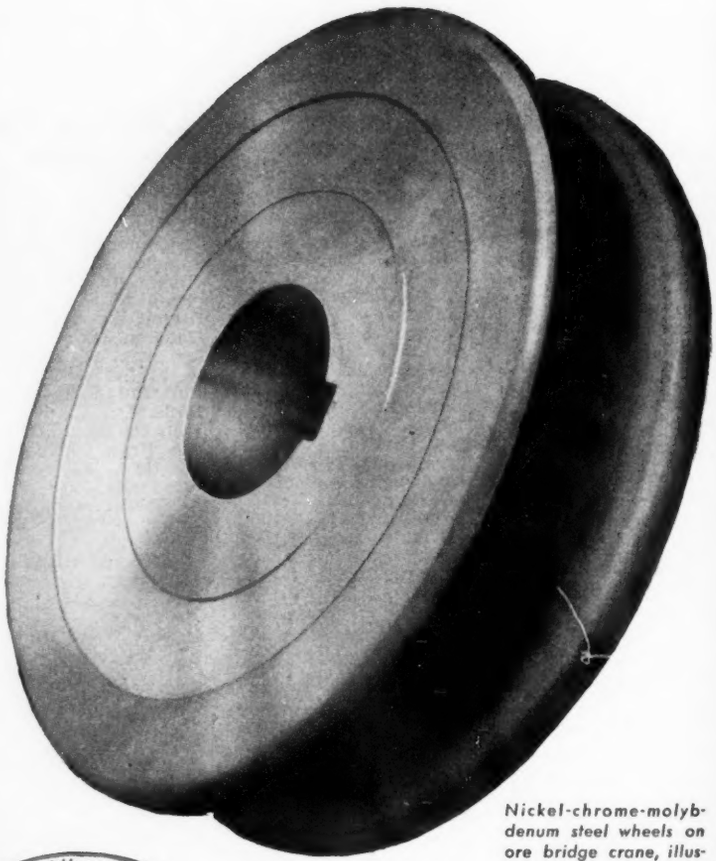
Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)..	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c).....	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.
***Less 0.15c where more than 10 bundles are ordered at once for delivery at one time.



4 TIMES LONGER LIFE IN NICKEL ALLOY STEEL TRACK WHEELS . . . .

STEEL mill equipment must function under severe treatment 24 hours a day, seven days a week. In order to reduce delays due to breakdowns and to maintain uninterrupted production, the Republic Steel Corporation (Central Alloy Division) adopted a policy of replacing all plant equipment subject to arduous service with suitable alloy steels ● Wheels for locomotive cranes, ingot cars, coke oven pushers, etc., are forged from Nickel-chrome-molybdenum steel containing 1.50 to 2.00% Nickel. These wheels give four times longer service than that previously obtained from wheels of plain carbon steel. The unusual depth of hardness obtainable in this type of Nickel Alloy Steel provides excellent wear-resistance, while its inherent toughness enables the parts to withstand sudden shocks ● There is a Nickel Alloy Steel suitable for every purpose where durability and dependability are requisites. The experience of thousands of users has contributed to a fund of valuable information on Nickel Steel properties and applications. Details and further information will be gladly furnished by our staff of engineers.



Nickel-chrome-molybdenum steel wheels on ore bridge crane, illustrated above. In plant of REPUBLIC STEEL CORP., Massillon, Ohio.

Nickel
ALLOY STEEL
Performs Better Longer

Dependable materials are the best assurance of dependable performance

INCO NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street **New York, N. Y.**

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 12.00c, Conn., for copper

Sheets	
Yellow brass (high)	18.62½
Copper, hot rolled	21.75
Lead, full sheets (cut ½c more)	9.00
Zinc sheet (100-lb. base)	9.50
Tubes and Pipes	
Seamless yellow brass (high)	23.50
Seamless copper	24.12½
Rods	
Yellow brass (high, full turnings)	16.87½
Naval brass	19.00
Anodes	
Copper, untrimmed	19.25
Wire	
Yellow brass (high)	19.12½

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	7.00 to 7.25
Chicago	7.00 to 7.25
Cleveland	7.00 to 7.50
St. Louis	7.25 to 7.50
Heavy Yellow Brass	
New York	4.25 to 5.00
Heavy Copper and Wire	
New York	7.50 to 8.00
Boston	7.50 to 7.75
Chicago	7.75 to 8.50
Cleveland	6.50 to 7.00
St. Louis	7.00 to 7.50
Red Brass Borings	
New York	6.50 to 6.75
Yellow Brass Tubing	
Cleveland	4.00 to 4.50
Light Copper	
New York	6.75 to 7.00
Chicago	6.75 to 7.25
Cleveland	6.00 to 6.50
St. Louis	6.75
Light Brass	
Boston	3.75 to 4.00
Chicago	4.25 to 4.50
Cleveland	3.00 to 3.50
St. Louis	4.00 to 4.25
Zinc	
New York	2.00 to 2.25
Cleveland	1.50 to 1.75
St. Louis	2.00
Aluminum	
Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	8.00 to 9.50
Borings, Cleveland	5.00 to 5.50
Mixed cast, Cleveland	6.00 to 6.50
Mixed cast, Boston	5.50 to 6.00
Mixed cast, St. Louis	6.00

Secondary Metals

Remelt aluminum No. 12	12.50
Brass ingots, 85-5-5-5	10.25

Quicksilver $106-108

New York—Quicksilver is quiet and unchanged at $106 to $108 a flask.

Metals

Uncertainty and Seasonal Dullness Depress Prices—Zinc and Copper Output Cut Further

New York—Seasonal quietness and several elements of uncertainty served to depress nonferrous metal prices in the past week. Tin prices fell to the lowest since 1902, zinc dropped to the lowest since 1896, and copper lost most of its recent recovery.

Zinc and copper statistics for November show that producers have made progress in curtailing production to the level of current shipments, but in the new wave of discouragement that has swept over all markets in the past few days, the brighter facts of the situation have been largely ignored.

Copper—Refined stocks increased more than 4000 tons in November but blister production was cut so that total stocks of copper were reduced 10,000 tons. This was the strongest statistical statement on copper in a number of months. Shipments fell off several thousand tons from those of October. One or two custom smelters and interests in the outside market have quoted prices down to 10.00c and less. Most producers are out of the market and consumers have shown extremely little interest. Most of them are covered on their needs for several months.

Zinc—Prime western has fallen to 4.00c, East St. Louis, on account of the lack of demand. Most producers have been reluctant to follow the decline. The ore market continues unchanged at $26 a ton. It is believed that galvanizers are not yet well covered for January requirements, and that when this buying develops, prices will firm up quickly.

Tin—Prices have fallen below 24.00c, or lower than the previous break in October when the depression stopped at 24.62½c. When the market touched 24.25c last Thursday, consumers bought well in accord with their policy of buying on the breaks, but since then they have not followed the market down with buying of any important size. Tin has been subject to the general state of pessimism and has been further affected by news of shipment of 3000 tons of unsold Banca tin from Java to Amsterdam. Usually, Banca shipments are several hundred tons a month that have already been sold.

Lead—Demand is light but prices have held steady. It is believed that consumers still have much buying to do for January.

Aluminum—New metal is unchanged but scrap is exceptionally low. Business is dull.—*Daily Metal Trade.*

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.21
90 per cent benzol	0.21
Toluol	0.30
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Delivered	
Sulphate of ammonia	$1.95

Coke By-Products Steady Some Contracting Noted

New York—Buying of coke by-products is limited mainly to needed spot lots. Stocks in consumers' hands are low due to the inventory period. Some contracting is being done for the first half, notably in naphthalene. Prices are unchanged and steady. Coke oven operations are still curtailed, and while demand is seasonally slow there is no large accumulation of surplus material. Phenol is moving in fair volume to the drug and plastic trades. Toluol buying shows little improvement. Benzol demand is not heavy for industrial needs, but prices are firm with the market in a strong position.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin—New York Spot	Straits Tin—New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
Dec. 10	10.87½	.....*	10.75	25.10	25.50	5.10	4.95	4.17½	22.90	7.05	35.00
Dec. 11	10.87½	.....	10.37½	24.22½	24.50	5.10	4.95	4.17½	22.90	7.10	35.00
Dec. 12	10.75	.....	10.37½	24.25	24.62½	5.10	4.95	4.12½	22.90	7.10	35.00
Dec. 13	10.50	.....	10.37½	24.25	24.62½	5.10	4.95	4.10	22.90	7.10	35.00
Dec. 15	10.25	.....	10.00	23.75	24.10	5.10	4.95	4.05	22.90	7.10	35.00
Dec. 16	10.25	.....	9.75	23.75	24.05	5.10	4.95	4.00	22.90	7.10	35.00

*Lake copper not quoted.

Europe

Steel Entente Continues Organization Six Months—Cuts Output—Tin Plate Brisker

London—(*By Cable*)—The European steel entente has decided to continue its organization, provisionally, until June 30, 1931. A further reduction of 5 per cent in production also has been agreed to. French export trade is increasing while Germans report their foreign business is slowing up. Belgium is holding its recent trade gains, good orders for various steel products being received from Argentina and China.

In Great Britain the steel markets are dull and no immediate improvement is expected. Less competition from European makers is noted at Birmingham. Freer competition among British tin plate mills has brought larger orders from Australia, Canada and Holland.

Continental pig iron is making inroads on business usually done by furnaces in the Middlesbrough district, but recent pig iron price reductions in the Midland have checked competition from Europe. Two hematite furnaces in the Barrow district are being damped.

British steel ingot and castings production in November amounted to 433,700 tons, compared with 512,500 tons in October, and 815,000 tons in November last year. November pig iron output totaled 384,100 tons, against 415,000 tons in October and 631,400 tons in November, 1929. Ninety-two stacks were operating Dec. 1, a loss of four.

British iron and steel imports for November were 209,769 tons, compared with 264,480 tons in October. November exports were 203,919 tons; October, 264,370 tons.

British and European Markets Feel Better Tone; Prices Being Adjusted

London—There is a slightly better tone in the European iron and steel export markets. The immediate cause seems to be a strengthening of continental steel prices, due to reduction of freight rates from Antwerp and adjoining ports to Far Eastern markets. As usual, the definite upward tendency of prices has brought consumers into the market and incited them to cover their requirements in fear of further rises.

Most of the inquiries thus attracted have resulted in orders for continental works, as their prices still are well below those quoted by British producers. However, sentiment in Great Britain also is more hopeful, as any upward tendency of continental prices tends to decrease competition on the British domestic market, but present levels still are far off the mark so far as the capacity for British works to compete is concerned. Generally speaking, inquiry for steel products from export markets has strengthened.

While steel prices have shown an upward tendency, there has been a substantial fall in pig iron quotations, due to disruption of the continental pig iron agreements. Up to the end of October prices of pig iron in France, Belgium and Luxemburg were maintained at a fixed level, but as trade depression became more acute, severe competition was experienced in the French market, particularly from Saar furnaces, and eventually the French pig iron office, known as the O. S. P. M., authorized its members to sell below the fixed price in order to meet this foreign competition. At the same time there were signs of increasing competition on the part of British furnaces, as a certain number of producers in Great Britain found it possible to meet French prices, and took advantage of this opportunity to retaliate against the considerable inroads made into Great Britain by French pig iron. Finally, market conditions got beyond control of the French pig iron organization and this office was broken up, with the resulting disruption of the Franco-Belgo-Luxemburg entente, and, as a consequence, the pig iron market now is free, and French prices have dropped vertically by as much as $7.50 per ton.

In order to beat the French in their own market, Belgian and Saar producers are obliged to quote foundry pig iron, 2.5 to 3 per cent silicon, at about 350 francs ($13.60) delivered; this corresponds to £2 16s, while the nominal price of Middlesbrough pig iron is £3 3s 6d ($15.40) f.o.b. port of shipment. Obviously, at such prices business is transacted at a loss, and it is purely and simply a price war. It is possible that eventually producers on both sides will realize the fallacy of such methods, and that an agreement may be arrived at between the different parties in order to protect each other's territory.

Receives Pretoria Works Contract

Among recent contracts received by engineering firms in Great Britain, the Woodall-Duckham Vertical Retort & Oven Construction Co., Ltd., London, has obtained the contract for the coking and by-product plant for the new Pretoria works; P. & W. MacLellan & Co. Ltd., Glasgow, has received an order for sheets, bars and other railroad material for the Egyptian State railways. Several orders for electrical equipment also have been received in England for delivery in South Africa, Australia and Canada.

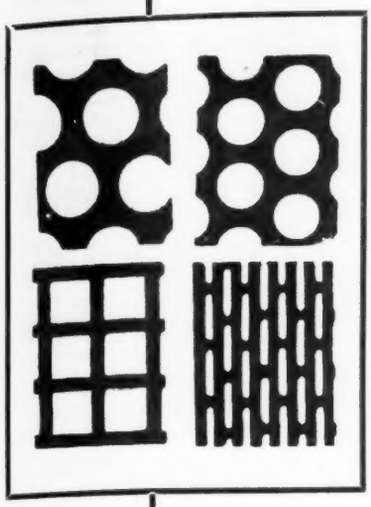
On the continent, slightly better news is received from Germany, where the demand for export business has improved and prices have followed an upward trend. Business, especially with Far Eastern and African markets, has been distinctly better. Orders also have been received from China, India and the Argentine.

Belgian Mills Booking Somewhat Better Orders

Brussels—A rise of 2s to 3s (50c to 75c) per ton in steel prices was registered at the meeting of the Brussels iron and steel exchange Nov. 19, brought about by a decrease of 5s ($1.20) in freight rates to the Far East. This hardening of quotations has surprised purchasers and has induced them to place a fair tonnage of orders, although it was a question whether this improvement would be maintained. However, at the meeting of Nov. 26 the tendency of the market was good.

This increase in steel prices is, nevertheless, insufficient to facilitate conditions for the smaller class of rolling mills, and a considerably

Perforated Metal Screens



An entire plant devoted to the manufacture of Perforated Metal and other sheet material

For

Grain Separating and Grading
Ore Sizing and Screening
Coal Screening and Washing
Pulp and Paper Mills
Sugar Refining

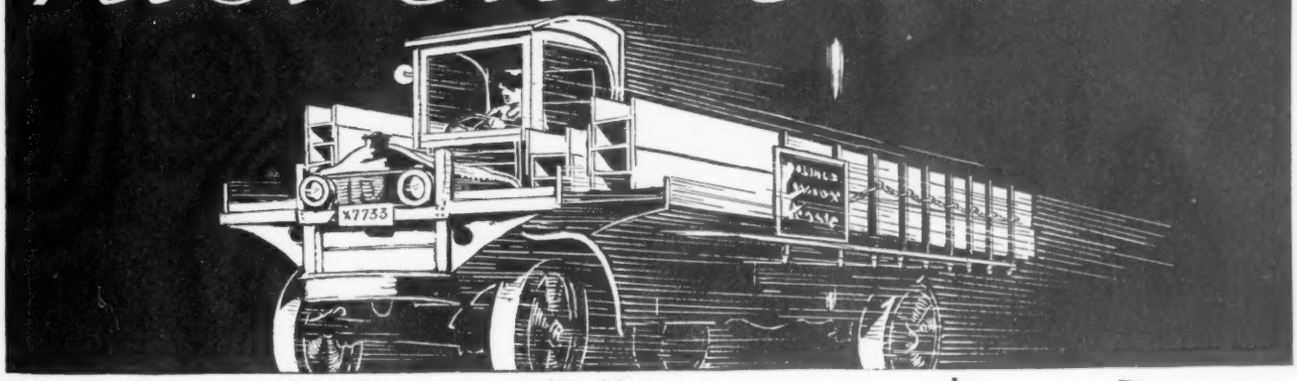
Grilles and Ventilators
Machine and Belt Guards
Wells
Drying Floors

All Sizes and Shapes of Perforations for Every Purpose

THE HARRINGTON & KING PERFORATING CO.

5634 FILLMORE STREET, CHICAGO, ILL., U. S. A.
NEW YORK OFFICE, 114 LIBERTY STREET

Fast Steel Service



Complete stocks carefully maintained . . . . Prompt shipment . . . . Three strategically located warehouses

For fast steel service, write, telegraph or telephone your instructions

ILLINOIS STEEL WAREHOUSE CO.
Subsidiary of United States Steel Corporation
St. Louis . . . . Chicago . . . . St. Paul

larger increase is necessary to enable them to sell at a profit.

On the whole, a better feeling is evident and it is hoped that the portion of public works which it has been decided to put in hand and which attains 425,000,000 Belgian francs ($11,800,000) will give more activity to the iron and steel industry. On the other hand, there is some anxiety due to the serious floods which have spread more or less all over the country, as the floods which occurred in the winter of 1927-28 resulted in a complete stoppage of a number of works.

French Out of Bar Market

Six-inch blooms now are quoted at £3 7s ($16.20) f.o.b. Antwerp, and 2-inch billets at £3 12s ($17.40). Sheet bars now are £3 14s ($17.90). Some business has been transacted, but French users are out of the market, which is not astonishing in view of the heavy tonnages they booked at the beginning of the month for quick delivery. Certain Belgian rolling mills also are buying tonnages of semifinished products. Quotations for merchant bars are fluctuating and depend on order books of the different works; some tonnages have been quoted at £4 7s 6d ($21.20), but for important orders the Providence works have accepted £4 3s ($20.10), the average quotation being around £4 5s ($20.60).

Beams now are quoted at £3 15s ($18.20), but practically no business is transacted at that price, and tentative offers had been made by purchasers at £3 10s to £3 11s ($17 to $17.20), but these offers are rejected by the works. The plate and sheet market is fairly good, and ¼-inch plates are quoted at £4 17s 6d ($23.55).

German Output Gains

Berlin—German production in October showed a gain over September in pig iron, steel ingots and castings and finished steel, although still short of the total for August, as shown in the following comparisons:

Mon. ave.	Pig iron	Steel ingots and castings	Finished steel
1913*	909,640	993,640	970,240
1927	1,091,375	1,359,225	1,069,930
1928	984,700	1,209,770	880,690
1929	1,116,730	1,353,820	940,425
1930			
Jan.	1,092,206	1,275,023	896,076
Feb.	964,517	1,176,435	797,899
March	1,007,576	1,201,206	834,349
April	901,358	1,033,383	737,355
May	859,657	1,034,088	735,741
June	767,395	859,310	603,378
July	770,928	905,763	664,401
August	739,083	896,514	619,861
Sept.	652,863	814,117	576,948
Oct.	687,497	856,433	622,617

*Present boundaries.

Luxemburg Tonnage Up

Brussels—October brought a larger output of pig iron and steel ingots in castings than September in Luxemburg, that of steel ingots and castings being the largest since April. Comparisons follow:

Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings
1913	....	212,320	111,355
1927	39	227,710	200,595
1928	38	230,840	214,315
1929	37	242,175	225,605
1930			
Jan.	37	249,875	216,315
Feb.	36	231,326	214,857
March	35	248,983	225,285
April	32	221,209	198,250
May	....	212,168	189,027
June	27	178,203	150,267
July	27	185,043	164,889
August	....	197,242	177,270
Sept.	26	190,225	186,448
Oct.	26	197,177	195,472

French Trade Is Less

Paris—French foreign trade in September showed a distinct decline from the figures of August, in both imports and exports. Figures, in metric tons, compare as follows:

	Imports		Exports	
Mon. ave.	Pig iron	Other iron and steel products	Pig iron	Other iron and steel products
1927	3,230	7,440	69,640	404,730
1928	3,365	8,320	52,215	368,410
1929	3,345	15,100	46,760	279,610
1930				
Jan.	11,806	22,374	44,016	259,133
Feb.	20,463	24,965	44,977	297,208
March	16,747	28,024	42,522	269,752
April	15,195	25,347	41,630	277,886
May	15,803	23,020	39,576	263,606
June	12,715	24,261	43,046	291,279
July	10,847	21,167	45,706	207,023
Aug.	11,702	24,323	45,382	273,648
Sept.	8,689	20,915	44,560	235,976

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, December 15	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable		£ s d		£ s d		£ s d		£ s d
PIG IRON								
Foundry No. 3, Silicon 2.50-3.00	$15.43	3 3 6*	$12.39	2 11 0	$12.39	2 11 0	$13.37	2 15 0
Basic-bessemer	15.92	3 5 6†	11.66	2 8 0	11.66	2 8 0	13.37	2 15 0
Hematite, Phosphorus 0.02-0.05	17.25	3 11 0	.....	.....	.....	.....	17.74	3 13 0
SEMIFINISHED STEEL								
Billets	$27.34	5 12 6	$17.98	3 14 0	$17.98	3 14 0	$17.98	3 14 0
Wire rods	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$32.08	6 12 0
Merchant bars	1.68c	7 15 0	.95c	4 6 0	.95c	4 6 0	1.07c	4 17 0
Structural shapes	1.68c	7 15 0	.84c	3 16 0	.84c	3 16 0	.81c	3 14 0
Plates, ship, bridge and tank	1.79c	8 5 0	1.07c	4 17 0	1.07c	4 17 0	.83c	3 15 0
Sheets, black, 24 gage	1.90c	8 15 0	1.91c	8 13 9	1.91c	8 13 9	1.93c	8 15 0
Sheets, galvanized, 24 gage, corrugated	2.44c	11 5 0	2.35c	10 13 9	2.35c	10 13 9	2.31c	10 10 0
Bands and strips	2.06c	9 10 0	1.03c	4 13 9	1.03c	4 13 9	1.02c	4 12 6
Plain wire, base	2.06c	9 10 0	1.29c	5 17 6	1.29c	5 17 6	1.43c	6 10 0
Galvanized wire, base	3.04c	14 0 0	1.49c	6 15 0	1.49c	6 15 0	1.61c	7 6 0
Wire nails, base	2.39c	11 0 0	1.30c	5 18 0	1.30c	5 18 0	1.32c	6 0 0
Tin plate, base box 108 pounds	$ 3.89	0 16 0	.....	.....	.....	.....	$ 8.26	1 14 0

Domestic Prices at Works or Furnace—Last Reported		Francs		Francs		Marks
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$15.43	3 3 6	$15.33	390(2)	$16.18	580	$19.80	83
Basic pig iron	15.80	3 5 0	20.63	525(1)	12.83	460	21.12	88.50
Furnace coke	3.16	0 13 0	6.60	168	5.02	180	5.13	21.50
Billets	27.34	5 12 6	21.62	550	17.02	625	28.04	117.50
Standard rails	1.79c	8 5 0	1.41c	785	1.61c	1,240	1.47c	136
Merchant bars	1.68c	7 15 0	.98c	545	.98c	750	1.48c	137
Shapes	1.84c	8 10 0	1.12c	620	.94c	720	1.45c	134
Plates, ship, bridge and tank	1.95c	9 0 0‡	1.37c	760	1.07c	820	1.65c	153
Sheets, black, 24 gage	1.90c	8 15 0	2.63c	1,460	2.41c	1,850	1.36c	126
Sheets, galvanized 24 gage, corrugated	2.44c	11 5 0	3.74c	2,075	2.73c	2,100	3.67c	340
Plain wire	2.06c	9 10 0	1.85c	1,200	2.15c	1,650	2.34c	217
Bands and Strips	2.17c	10 0 0	1.23c	685	1.43c	1,100	1.72c	159

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £12 5s 0d ($59.54) delivered Atlantic seaboard, duty-paid. German ferromanganese £12 5s 0d ($59.54) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

A NAME THAT SYMBOLIZES SERVICE . . .

Careful selection of raw material — modern equipment at every stage of manufacture—and trained operators have combined for nearly 50 years to build a product that is celebrated for high quality in every respect. The usual (N) branded right in each item is your guarantee of ruggedness, uniformity, accuracy, finish, dependability and service.

Neely
NUT & BOLT CO.
PITTSBURGH, PA.

BOLTS · NUTS · RIVETS · RODS · UPSET FORGINGS

"NATIONAL" ROLLS

Chilled Sheet Tin and Plate Rolls
Open Hearth Steel Castings
Steel Alloy Rolls
Rolling Mill Machinery

NATIONAL ROLL & FOUNDRY CO., AVONMORE, PA.

Machinery

INCLINATION on the part of machine tool men to view the market situation in a slightly more cheerful light continues this week. While this may be attributable in some measure to readjustment to conditions, signs of reawakening activities in certain key industries are major factors. Stirrings are noted in the electrical field, and orders and rumors of orders filter out of Detroit. The navy department is placing some business and pressure is being brought to bear on the army ordnance department to release an equipment program. A distinct revival is occurring in the crane and hoist business.

New York—Machine tool buying and inquiry are spotty. Some slight improvement is noted by a few builders, but the aggregate volume of business continues light. Inquiry on equipment for the first quarter of next year is slack, although some increase in orders is expected during that period. The extent of this improvement, however, is uncertain. Many hold to the opinion that improvement, once it starts, will be gradual. Railroad requirements will not be large, according to some machine tool builders, who believe that railroad shop expansion in the near future is unlikely. Potential replacement volume looms large, 1931 business in this direction being expected to be much heavier than during the year just closing. However, this type of business, like new equipment business, will be dependent on recovery of general manufacturing.

Small tool demand has slumped, following a slight flurry at the start of the first quarter. December, which ordinarily is an off month, will fall below the average, according to most builders. Detroit is showing more interest which is expected to be reflected in the attitude of accessory makers. Many builders and dealers trace their slump this year primarily to the drop in automobile production, which reduced the volume not only from the automobile building plants but also from the builders of parts and accessories.

The navy department and arsenals are taking a few tools from time to time. The navy department takes bids on five motor-driven engine lathes for the Boston navy yard Dec. 19, and also took bids Dec. 9 at Washington on about 90 chain hoists for yards on both the east and west coasts. Electric overhead crane builders note an increase in inquiry in some quarters and as a rule are more optimistic. New business with several of these builders has increased during the last quarter.

Pittsburgh—Machine tool awards and inquiry are steady, with orders mostly involving special tools. Standard equipment, such as lathes, planers, and shapers, continues slow. New inquiry is but little distributed and large lists are lacking. Carnegie Steel Co. has awarded a contract to the Westinghouse Electric & Mfg. Co. for electrification of a steam-operated bar mill located at their Duquesne works.

Cleveland — The more cheerful feeling, which was mentioned last week as being evident in machine tool circles, continues, just enough scattering but well distributed business having come in in the meantime to keep the morale buoyed up. Small orders and rumors of bigger ones which have come down from Detroit have been a distinct factor in this situation. Inquiries continue in hopeful numbers, with a demand for complete facts and figures indicating keen analytical interest on the part of prospects in engineering improvements for which increased production, greater accuracy and lower costs are claimed.

Comment frequently has been made in this department regarding the recent engineering activity among machine tool builders. This continues unabated and unquestionably will color the entire advertising and sales picture during 1931. This already is having an effect upon the employment situation as far as draftsmen and designers are concerned. Employment services report having placed a considerable number of men of that caliber—the understanding in most cases being that the work will be temporary unless routine engineering department activities revive before the special work is completed.

Chicago—Machine tool dealers have been cheered by the mild pick-up in single inquiries for some types of equipment in the last few days. No lists have developed, but more than casual interest is shown by a number of buyers. Several houses report more numerous calls from prospective buyers interested in inspecting equipment now on dealers' floors. Several inquiries for presses from the light manufacturing trade now are before the market, and sheet metal working equipment sales generally are fair. Orders for welding equipment and friction saws also have been placed.

An industrial equipment manufacturer north of here is getting figures on a program planned for first quarter, next year. Chicago, Burlington & Quincy railroad is asking for figures on a 6-foot radial drill. A local steelworks has added a sawblade grinder to its recent inquiries. A number of machine and production tools was sold at federal court auction. Dec. 17 at the plant of Hamilton-Ross Factories, Inc., Kokomo, Ind. Despite the recent pressure of a few buyers against current price lists, machine tool prices are being maintained firmly.

Worcester, Mass.—Some lists are developing from Russian sources and through the navy, though no orders are being closed as yet. No sign of increased activity in grinders is discernible, and other machine tool lines remain equally weak. The outlook for first-quarter business, outside of the sources mentioned, is not encouraging.

Overhead Crane Business Again Shows Decline

New York—Shipments and new orders in November again declined compared with the previous month, according to the Electric Overhead Crane institute. Shipments totaled 60 units with a tonnage capacity of 1031 valued at $586,503.75. This compares with 66 units, 876¼ tonnage capacity, valued at $676,649 in October. Forty-one new orders were booked during the month, with a tonnage capacity of 778 valued at $370,443.25, against 45 units, tonnage capacity 707, valued at $352,680.75 for the previous month. These figures indicate that while new orders were four less in number, the cranes were of a heavier capacity. Unfilled orders Dec. 1 were 142 units, with a tonnage capacity of 4064, valued at $1,863,888.93. On Nov. 1 unfilled orders were 149 units, with a tonnage capacity of 4047, valued at $1,947,880.43.

Hoist Business Improves

New York—According to the Electric Hoist Manufacturers' association, new orders during November increased 3.738 per cent over October, their value representing an increase of 2.373 per cent and shipments showing an increase of 1.4384 per cent.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

HARTFORD, CONN.—Descomb Flying Service Inc., Brainard field, will build a service hangar, 120 x 120 feet, next spring.

BOSTON—New England Steel Tank Co. has been incorporated with 1000 no par shares by Charles F. Koopman Jr., 124 Anawan avenue.

BOSTON—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 6 on schedule 4744, class 104, for one engine lathe, screw-cutting, high speed, heavy duty, motor-driven, bed 15 inches by 8 feet, for delivery here.

BOSTON—Cape & Vineyard Electric Co., Main street, Falmouth, Mass., subsidiary of Associated Gas & Electric System, 61 Broadway, New York, is having preliminary plans prepared for a power plant addition. Cost is estimated at $40,000. Plans are private.

CAMBRIDGE, MASS.—Harvard university has filed plans for a chemical and mechanical laboratory. Approximate cost, $1,500,000.

WATERTOWN, MASS. — Western Electric Co., 379 Summer street, Boston, will occupy a plant unit to be built here at a cost of about $40,000. Bids are being taken by the New England Telephone & Telegraph Co., 245 State street, Boston. Monks & Johnson, 99 Chanucy street, Boston, are architects.

NEWPORT, R. I.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 6 on schedule 4743, class 103, for one motor-driven bending roll, for delivery to the naval torpedo station here.

New York

BROOKLYN—Hartenstein Metal & Rope Co. has been incorporated with $20,000 capital by Samuel Jacobs, 217 Havemeyer street.

BROOKLYN—Bureau of water supply, department of water supply, gas and electricity, municipal building, New York, advises that the pumping station recently noted as planned will be approximately 60 x 105 feet, contracts to be placed by next spring. Equipment will consist of five 2700-gallons per minute motor-driven centrifugal pumps, contract for which will be placed separate from the building contract. Cost of the entire project is estimated at $400,000. (Noted Dec. 4.)

BUFFALO—Buffalo Auto Spring Co. Inc., recently organized, has leased space in a building now being erected at 1450 Michigan avenue.

NEW YORK — Rowland's Machine Shop has been incorporated with 100 common shares by H. Pressprich, 38 Park row.

NEW YORK—M. K. Frank, 220 East Forty-second street, is reported to be inquiring for 4-track tipple equipment, including two loading booms of about 1000 tons daily capacity; incline sheave drum equipment for plane, 2000 feet long; 100 kilowatt synchronized motor; two 6-ton gathering, low-type locomotives; generator set, 50 mine cars.

POUGHKEEPSIE — Waterproof Super Metal Products Co. Inc., whose incorporation recently was noted, will operate a plant for the manufacture of metal goods. John R. Phillips, 194 Winikee avenue, is head of the company. (Noted Nov. 20.)

Pennsylvania

ERIE—Premier Engineering Co., 31 West Tenth street, has been incorporated with 30,000 no par shares by R. W. Bauer, same address, to design special machinery and equipment, manufacture and deal in machinery, sheet metal products, electrical products and other utility specialties.

PHILADELPHIA — Philadelphia Storage Battery Co., Victory building, proposes to build a plant unit at Ontario and C streets. Plans are being prepared by William Steele & Sons Co., Fifteenth and Cherry streets.

Blackman Hill & Co., machine tool distributors, St. Louis, recently opened a display room at Tulsa, Okla., a view of which is shown above. It is an unusual display and demonstration of machine tools by a nationally known jobbing concern. Alexander Nuetzel, treasurer of the company, is in charge. Machine tool equipment for use in the oil industry is featured, being shown in actual operation

PITTSBURGH—Higgins Motor Corp. has been incorporated with $50,000 capital by Julius Baer, 5616 Marlboro road, to manufacture, repair and deal in motor vehicles, aircraft, machinery and parts.

New Jersey

BORDENTOWN—Department of institutions and agencies, state house annex, Trenton, N. J., proposes to erect an industrial school here at a cost of about $150,000.

CLOSTER—John J. Demarest Inc. has been incorporated with $500,000 capital by Albert J. Wuytack, Dumont, N. J., to deal in machinery.

IRVINGTON—New Jersey Bell Telephone Co., 1060 Broad street, Newark, N. J., plans to build a storage and service unit here. Estimated cost, $500,000.

NEWARK—Industrial Metal Co. Inc. has been incorporated with $50,000 and 1000 common shares by George B. Chandless, 212 Main street, to deal in metal products.

ROSELLE PARK—Park Sign Works has been incorporated with $100,000 capital by Nicholas A. Tomaluso, to make electric signs.

Ohio

AKRON—City, F. E. Swineford service director, is completing plans for an aeronautical laboratory for the Guggenheim aeronautical research institute. M. M. Konarski, Central High School building, is architect. Cost is estimated at $100,000.

BARBERTON — Babcock & Wilcox Co., manufacturer of boilers and stokers, will enlarge its plant by adding approximately 40,000 square feet of floor space into which will be moved the operations of Fuller-Lehigh Co., Allentown, Pa., a subsidiary. Fuller-Lehigh Co. makes equipment for pulverizing and burning coal. Transfer will take place about Feb. 1.

CLEVELAND—Universal Specialties Corp., 1900 West Twenty-fifth street, manufacturer of office supplies and metal novelties, will expand operations for the production of new items. Company has been acquired by Paul V. Jones, former secretary of the Cleveland Folding Machine Co.

CLEVELAND — Electromatic Gas Control Corp., 1802 Columbus road southwest, has started operations for the manufacture of a device for the automatic regulation of gas on hot water heaters. William Bauer is president, George Herbster, inventor of the device, is vice president, and J. H. Rose is manager.

DAYTON—Ohio Voting Machine Co. has been incorporated with $50,000 and 1000 no par shares by O. B. Brown Inc., 42 East Gay street, Columbus, O.

TOLEDO — Moto-Meter Gauge & Equipment Corp., Long Island City, N. Y., recently noted as moving its automotive division here, will expand operations here and at La Crosse, Wis. (Noted Aug. 14.)

WILLARD—Willard Metallic Crypt Co. has been incorporated with $25,000 capital by J. W. McCarron, Guarantee Title building, Cleveland.

Indiana

GARY—Phillips Petroleum Co., Bartlesville, Okla., will erect a machine shop and garage at 728 Colfax avenue. Approximate cost, $40,000. Plans are private.

SOUTH BEND—South Bend Bait Co., manufacturer of fishing tackle, reels and other sports goods, has awarded contract to R. Sollitt & Sons, 518 East Sample street, for the erection of a 1-story addition, 100 x 100 feet. Cost is estimated at $65,000, with equipment.

Michigan

CENTER LINE—Clinton Campbell is at the head of an organization which will establish the manufacture of refrigerators. Plant will be located in the Eckstein-Lakie building on Mound road.

DETROIT—Igloo Cooler Corp., 3345 Kendall avenue, has been incorporated with $25,000 capital by Harry Must and I. G. Konikow, to manufacture and sell automatic electric coolers.

DETROIT — Chief Electric Water Heater Co., 13319 Twelfth street, has been incorporated with 7500 no par shares by John Bodenstab and D. B. Hamilton, to manufacture and deal in electric machines, appliances and devices for the production of heat.

DETROIT—Marks Lissberger & Son Inc., 23-01 Borden avenue, Long Island City, N. Y., advises through M. L. Lissberger, president, that the company has not acquired and does not propose to acquire a site in the Detroit area, as recently noted. (Noted Dec. 4.)

HOLT—Holt Mica Spark Plug Co. advises through Clayton E. Hunt, president, that the company will award contract for a plant, recently noted as planned, early next year. Automatic screw machines and second operation machinery will be needed. (Noted Dec. 11.)

LUDINGTON—Pere Marquette railway, General Motors building, Detroit, will build a marine repair shop here. Contract has been let to Oscar Nelson, Ludington.

MUSKEGON—A. A. Clarke Co. has been incorporated with $250,000 capital by A. A. Clarke, Muskegon, and S. E. Pearce, 139 North Clark street, Chicago, to deal in sanding machines, vacuum cleaners and electrical motors.

Illinois

CHICAGO—Pound Air Filter Co., 815 Larrabee street, has been incorporated with $20,000 capital by Howard W. Pound, to make air filters.

CHICAGO—Howe Mfg. Co., 219 St. Johns court, is expanding operations in a 1-story, 50 x 108-foot building recently leased. Company makes signal devices.

CHICAGO — Commonwealth Edison Co., 72 West Adams street, has let contract to the MacDowell Construction Co., 20 North Wacker drive, for a 3-story substation at 2141 South Troy street.

CHICAGO — Commonwealth Edison Co., 72 West Adams street, has let contract to T. G. Gage Co., 64 West Randolph street, for a 1-story substation, 60 x 44 feet, to cost $20,000. Contract also has been let to H. W. Green Construction Co., 400 West Madison street, for a 1-story, 73 x 118-foot laboratory addition. Cost is estimated at $50,000. N. C. Von Hoder, 20 West Wacker drive, is architect.

GALESBURG—Fire recently damaged the main plant of the Rowe Mfg. Co. Loss to stock, building and equipment, approximately $100,000, insured. Company manufactures hardware specialties and farm equipment.

MT. VERNON—Mt. Vernon Tube Sign & Mfg. Co., Second and Watson streets, whose incorporation recently was noted, plans to operate a plant for the manufacture of signs and electric displays. (Noted Nov. 13.)

Southern States

MONTGOMERY, ALA.—Repair and storage facilities of the Atlanta & West Point railroad and Western Railway of Alabama, O. T. Nelson chief engineer, Atlanta, Ga., recently were damaged by fire. Approximate loss, $20,000.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids Jan. 6, for delivery on alternate bids to either officer-in-charge, naval operating base, Hampton Roads, Va., or to district supply officer, Pier 44, San Francisco, Calif., the following items: On schedule 4705, class 54, two sensitive bench drills, motor-driven, size 0 to ½-inch; on schedule 4716, class 58, one 36-inch motor-driven band saw; on schedule 4717, class 59, one single frame steam forging hammer.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids Jan. 6 on schedule 4747, class 107, for one motor-driven drum and disk sander. Alternate bids will be taken for delivery to the naval supply depot, Hampton Roads, Va., and the district supply officer, Pier 44, San Francisco. Alternate bids will be taken Jan. 13 on schedule 4755, class 120, for a drill press, motor-driven, with tapping attachment. Alternate bids will be taken Jan. 6 on schedule 4749, class 111, for one motor-driven, 20-inch planer and jointer. Single bids will be taken Jan. 6 on schedule 4736, class 96, for one engine lathe, 12-inch, geared head, screw cutting, self contained, motor driven, for delivery at Hampton Roads.

DAYTONA BEACH, FLA.—Daytona

Beach airport plans to construct a hangar, 60 x 180 feet.

HOLLYWOOD, FLA.—Hollywood Machine & Iron Co., whose plant recently was damaged by fire, is reported to have plans for rebuilding. Loss was estimated at $50,000. (Noted Nov. 13.)

JACKSONVILLE, FLA. — Chevrolet Motor Co., 3044 Grand boulevard, Detroit, is reported to plan the establishment of a branch plant here for the assembly of truck bodies.

NEW PORT RICHEY, FLA.—Florida Power Corp., St. Petersburg, Fla., proposes to increase its substation facilities here.

OCALA, FLA.—Airport board of city council, Leonard Todd chairman, is considering erection of a hangar unit.

MERIDIAN, MISS.—Orr Mfg. Co. Inc., 1616 Seventeenth street, J. A. Orr president, recently incorporated with $50,000 capital, proposes to manufacture an automatic radiator drain for automobiles.

AIKEN, S. C.—Board of public works proposes extensions in the municipal light and power plant, to include installation of equipment. Burns & McDonnell Engineering Co., Interstate building, Kansas City, Mo., is engineer.

GREENVILLE, S. C.—Great Dane Co. Inc. has been incorporated by William Lowndess Jr., 18 William street, and proposes to establish a plant for the manufacture of truck trailers.

BRISTOL, VA.—Bristol Steel & Iron Works Inc. is reported to be in the market for an air hammer, 5 x 5 inches, self contained with compressor, used.

NORFOLK, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 6 on schedule 4748, class 108, for one high-speed metal cutting saw, complete with motor, for delivery to the supply officer, navy yard, Norfolk. Bids for the same item on schedule 4748, class 108, will be received at the same time. Bids also will be received for one gear cutter and hobber, on schedule 4754, class 119.

HANDLEY, W. VA.—Chesapeake & Ohio railway, C. W. Johns chief engineer, First National Bank building, Richmond, Va., has let contract to W. P. Thurston Co. Inc., 301 South Fourth street, Richmond, for a round house addition here.

Missouri

KANSAS CITY—Acme Furnace & Sheet Metal Works, 407 Southwest boulevard, recently noted as planning a shop, advises that construction contracts have been let and that equipment needed will include complete facilities for general sheet metal work. (Noted Dec. 11.)

ST. LOUIS—Dreste Radiator Shield & Enclosure Co. has been incorporated by George A. Delf, 2131 Forest street.

ST. LOUIS—Century Electric Co., 1806 Pine street, is building a 1-story foundry addition at 3763 Market street. Units will be 43 x 94 feet and 41 x 286 feet. Edward J. Lawler, 3727 Market street, is architect. (Noted Nov. 6.)

Oklahoma

OKLAHOMA CITY—General Motors Corp., Detroit, is reported to plan to establish an assembly plant on West Eleventh street here, to be used by the Commercial Body division of Chevrolet Motor Corp., 3044 Grand boulevard, Detroit.

TULSA—Plumbers' Supply Co., 323 West First street, has let contract to Patterson Steel Co. for a 1-story storage plant and mechanical shop, 50 x 165 feet. Cost, with equipment, is estimated at $25,000.

Texas

TENAHA—City council is considering construction of a waterworks system and purchase of pumping equipment. J. H. Womack is clerk.

Wisconsin

AMHERST—City, L. A. Hanson clerk, has closed bids for the erection of a pumping station. Two 300 to 400 gallons per minute centrifugal pumps with industrial gas engine drive will be installed. W. G. Kirchhoffer, Madison, Wis., is consulting engineer.

JANESVILLE—Chevrolet Motor Co., 3044 Grand boulevard, Detroit, has acquired the former Townsend Tractor Co. plant here and has started remodeling it for the production of commercial car bodies. Recent acquisitions also include two local truck body concerns.

KEWAUNEE — Hamacheck Machine Co., maker of pea viners and other special equipment for canning companies, is having plans prepared for three shop extensions which will increase present capacity about 100 per cent. Construction will start early next spring.

LA CROSSE—Moto-Meter Gauge & Equipment Corp., Long Island City, N. Y., recently noted as moving its automotive division to Toledo, O., will expand its plants there and here.

MANITOWOC — Aluminum Specialty Co. has awarded contracts for the erection of two plant extensions to provide 7200 additional square feet of floor space.

MILWAUKEE — County commission, W. J. Cary county clerk, is to receive bids Dec. 18 for Hangar No. 3 for the county airport. Previous bids were rejected and plans were revised. Unit will be 100 x 100 feet and will cost about $50,000 complete. (Noted Aug. 14.)

REDGRANITE—Machine shop of the Universal quarry recently was damaged by fire.

SUPERIOR—City council is investigating sites for a proposed new shop building for the vocational training system. Unit will be 100 x 200 feet, costing about $100,000. M. G. Beckley is city clerk.

Iowa

MALVERN—Iowa-Nebraska Light & Power Co. will make improvements to its local power station at a cost of about $80,000.

Kansas

CHANUTE—W. A. Baird, 428 West Sixth street, recently noted as considering erection of a machine shop at Harrison, Ark., advises that other locations are being investigated and the shop may be located at some other point. (Noted Dec. 11.)

KANSAS CITY—Board of public utilities, department of water, light and power, advises through James D. Donovan, that principal equipment for original installation has been secured for the new power station. Further expansion and purchase of additional expansion will be delayed until late in 1931. (Noted Dec. 11.)

Montana

BILLINGS — City council has awarded contract to Frank Jacoby & Sons, Helena, Mont., for construction of a hangar unit, 80 x 90 feet, to be erected at municipal airport at a cost of about $10,000.

Arizona

FLORENCE — Randolph irrigation district plans to build 34 pumping plants and wells. Scott Engineering Co., Ellis building, Phoenix, Ariz., is engineer. Cost is estimated at $620,000.

Utah

BINGHAM—Compressor plant and equipment of the Park Bingham mine recently was virtually destroyed by fire, with loss estimated at $10,000.

Pacific Coast

BENBOW, CALIF. — Benbow Co., Benbow, Humboldt county, will build a power plant to cost $25,000 in connection with a project here. Plans are by the Ambursen Dam Co., Alexander building, San Francisco.

MARE ISLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 6 for one motor generator set; generator 80 kilowatts, 5000 amperes, 16 volts direct current, motor 2300 volts, 3-phase, 60-cycle, alternating current, for delivery here. Bids will be received Jan. 13 for four sets of propelling machinery for a light cruiser, including turbines, auxiliary equipment and parts, for delivery f.o.b. cars or wharfs for shipment here.

MARE ISLAND, CALIF.—Bureau

of supplies and accounts, navy department, Washington, will receive bids on January 13, for delivery to the supply officer of the navy yard here, the following items: On schedule 4723, class 67, 8 vertical turbine-driven, forced draft blowers and spare parts; on schedule 4725, class 69, boiler parts and spare items for boiler parts, including fuel oil burners, superheaters and blowers, etc. Plans for the same are deliverable to the central drafting office, navy yard, Brooklyn, N. Y.

OAKLAND, CALIF.—Board of education will receive bids soon for the construction of a high school, to include a vocational shop. C. W. McCall, 1404 Franklin street, is architect. Estimated cost, $400,000.

SAN DIEGO, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 6 on schedule 4765, class 170, for one duplex air compressor, two-stage, motor-driven, for delivery here to the supply officer, naval air station.

SANTA CRUZ, CALIF.—Coast Counties Gas & Electric Co., San Francisco, plans extension to power substations and lines near here. Cost is estimated at $500,000.

BREMERTON, WASH.—Bureau of supplies and accounts, Washington, will receive bids Jan. 6, for delivery to the supply officer, Puget Sound navy yard, Bremerton, on schedule 4719, class 60, one grinder, tool and cutter, motor-driven.

BREMERTON, WASH.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 13 on schedule 4756, class 121, for one motor-driven precision lathe, for delivery to the supply officer, navy yard, Puget Sound, near here.

SEATTLE—Ford Motor Co., Fordson, Mich., has called for bids for the construction of a branch assembly plant here, through Albert Kahn, architect, Marquette building, Detroit. (Noted Oct. 23.)

SEATTLE — Tourtellotte-Bradley Mfg. Co. advises that needs for the 63 x 190-foot plant now being erected for the manufacture of steel sash, furniture and fixtures will include a 15-ton press, butt welder and two Bliss presses. (Noted Dec. 11.)

Dominion of Canada

ST. JOHN'S, N. F.—Newfoundland railway, W. F. Joyce chief engineer, has let contract for the construction of a locomotive shop, 60 x 140 feet, machine shop, 62 x 320 feet, and tender shop, 39 x 270 feet.

GALT, ONT.—Steel Service Ltd. has been incorporated with $100,000 capital by Samuel S. Lunenfield, to manufacture and deal in babbitt, brass and steel.

KITCHENER, ONT.—Waterloo Engineering & Equipment Co. Ltd. has been incorporated with $40,000 capital by William E. Brock and Daniel W. Houston, to manufacture and deal in engines, boilers, power plant equipment, automobiles and airplanes.

TORONTO, ONT.—Tower Tube Corp. Ltd. has been incorporated with $40,000 capital by A. Singer, 100 Adelaide street west, to manufacture and deal in radios, radio tubes and parts.

TORONTO, ONT.—Kellogg Mann Incinerator Co. Inc., 315 Grote street, Buffalo, N. Y., is reported to be considering erection of a plant here for the manufacture and assembly of incinerator equipment.

TORONTO, ONT.—Eastern Wrecking & Construction Co. Ltd. has been incorporated with $40,000 capital by Harry M. Sherman, 45 Richmond street west, to carry on the business of contractor, steel fabricator and manufacturer of building materials.

WINDSOR, ONT.—Canadian National railway, H. W. Mathews superintendent, St. Thomas, Ont., will build next year, shops and roundhouse facilities at a total cost of $3,000,000.

BUCKINGHAM, QUE.—James McLaren Co. Ltd. has received bids for the construction of a 12,000-horsepower hydroelectric plant near here, to cost $10,000,000. (Noted Sept. 11.)

MONTREAL, QUE.—Montreal Underground Ltd. is reported in the process of organization here and in New York and London, Eng. Construction of underground tunnels proposed would cost about $100,000,000. S. Ouimet, 706 St. Gabriel street, is engineer.

SHERBROOK, QUE. — Superheater Co. Ltd., Drummond street, will erect a 2-story plant addition at a cost of $50,000. Unit will be 38 x 140 feet.

New Trade Publications

LUBRICATION—The November issue of *Lubrication*, a publication of the Texas Co., New York, is devoted to problems of the paper industry. Illustrations and text cover the methods found best for various portions of equipment.

TACHOMETERS—Catalog No. 46 has been issued by the Brown Instrument Co., Philadelphia, covering its line of electric indicating and recording tachometers. Illustrations and data cover standard applications of these instruments.

CRANES—Unusual uses for locomotive cranes are shown in pictures in the current issue of the bulletin of the Crane Service association, Lorain, O. Some of the uses seem beyond ability of the cranes to accomplish, but the pictures prove them feasible.

TRAMRAIL—A bulletin by the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O., suggests use of its service in solving problems of materials conveying. Illustrations show solutions applied to various lines of industry.

ANNEALING FURNACES—Westinghouse Electric & Mfg. Co., Mansfield, O., has issued a bulletin on its electric bell type of annealing furnace. They are of two types, cylindrical and rectangular. Advantages claimed are close temperature control and control of atmosphere to minimize oxidation.

METAL FLOORING—A bulletin by the Irving Iron Works Co., Long Island City, N. Y., presents engineering data on metal mesh flooring and shows improvements in this type of floor evolved in the past few years. Diagrams show various types and tables give data in compact form.

MOTOR STARTER—A hand-operated alternating current starter is described in bulletin 609 by the Allen-Bradley Co., Milwaukee. It is designed for use with 5 horsepower, 220-volt and 7½ horsepower 440 and 550-volt squirrel-cage motors. Overload protection is urged as an element in its favor.

SPEED TRANSMISSION — An all-metal variable speed transmission, positive and infinitely variable, is described in book No. 1274, issued by the Link-Belt Co., Chicago. Applications to industrial uses are shown and features of construction also are illustrated, including the side-tooth chain operating in contact with toothed disks, giving positive action.

INDUSTRIAL LOCOMOTIVES—Brookville Locomotive Co., Brookville, Pa., in bulletin B-27 describes a series of its industrial locomotives in 4½ to 12-ton capacities. They are powered with McCormick-Deering power plants. Illustrations show details of construction and tables present data on capacity of various sizes.

SAW FILES—A leaflet by the Saw & Knife Specialty Co., 1375 East Thirty-third street, Cleveland, describes its line of saw files. The suggestion is made that it is the shape that counts in selecting the proper file for saw sharpening, eliminating danger of developing cracks and breakage in filing.

PULVERIZER—Its new type of pulverizer is presented in bulletin 5-80 by the Fuller Lehigh Co., Fullerton, Pa. Construction and operation are described and illustrated. Grinding is accomplished by ball and grinding ring, wear of the parts having no effect on the fineness of the material produced. The bulletin shows the method of obtaining desired pressure. Two rows of balls moving at low speed give smooth, quiet grinding.